AVIATION WEEK

50 CENTS

WHERE NOTHING IS LEFT TO CHANCE

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We have always thought of quality *first*.

Toward this end we have designed unique development and production procedures, invented new kinds of test equipment, even synthesized special raw materials—like high grade rubber the market couldn't provide.

The illustrations above and to the right indicate that because quality and performance are of first importance, in the development of *Honeywell* aeronautical products, nothing is left to chance.

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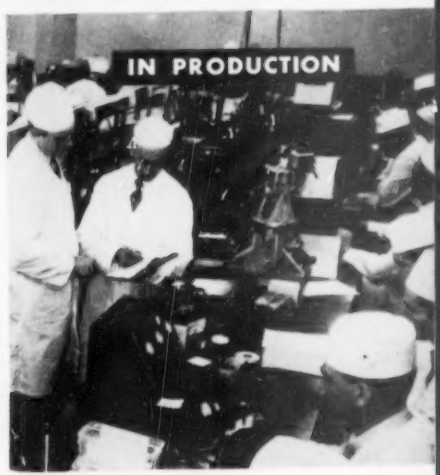

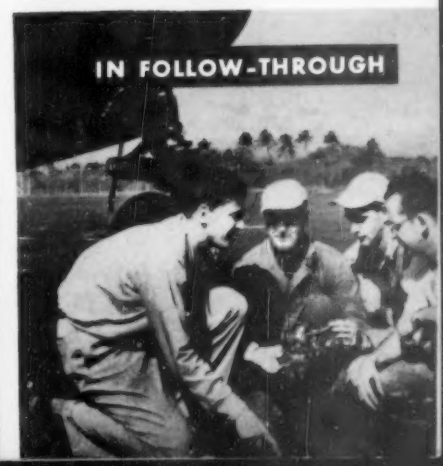

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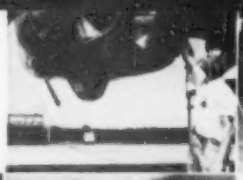
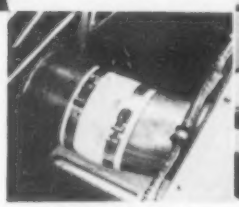
Each of the 12 vents on the B-36 are wrapped with resistance wire and Silastic R Tape to keep ice from plugging oil vent lines.



Thin layers of Silastic insulate bare resistance wire inside jet intake door panels; conduct deicing heat evenly and rapidly to panel surfaces.

More than 180 limit switches on the B-36 are protected with Silastic boots to assure reliable operation at temperatures ranging from —100° to 170°F.

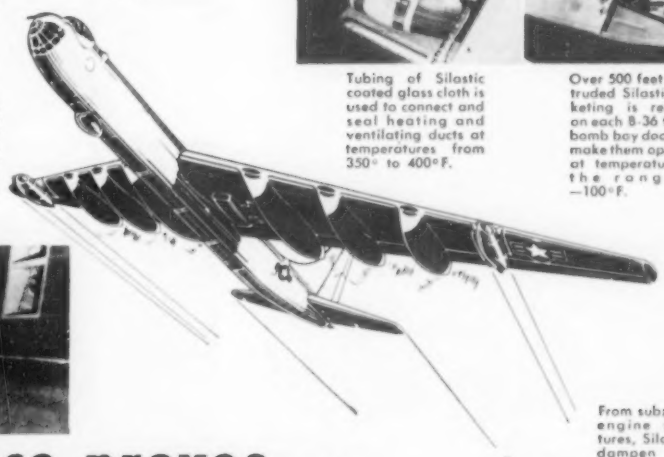
Silastic-coated glass cloth gaskets on the rockerboxes of the P & W engines give long service in contact with oil at temperatures up to 450°F.



Nose turrets are sealed with two 56-inch lengths of cloth-wrapped, sponged Silastic tubing.

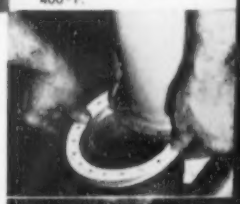
Over 300 Silastic flange gaskets in each B-36 seal hot air system at temperatures as high as 400°F.

"Orlon" wrapped, sponged Silastic seals prevent air turbulence between flap and engine nacelle; last 10 times as long as materials previously used.

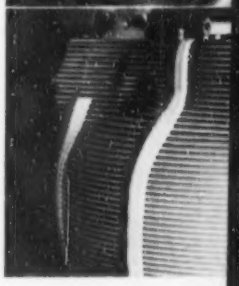


Tubing of Silastic coated glass cloth is used to connect and seal heating and ventilating ducts at temperatures from 350° to 400°F.

Over 500 feet of extruded Silastic gasketing is required on each B-36 to seal bomb bay doors and make them operable at temperatures in the range of —100°F.



Ninety feet of cloth-wrapped, sponged Silastic is used to prevent turbulence and short circuiting of air between leading edge of the flaps and trailing edges of the wings.



From subzero to hot engine temperatures, Silastic strips dampen vibration and prevent breakage of cooling fins on aircraft engine cylinders.

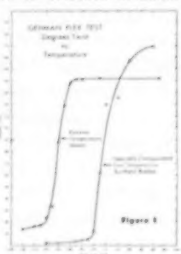
Performance proves...

SILASTIC* works

where other materials fail!

Extreme temperature Silastic stocks are the only rubbery materials that retain their resilience after long exposure to temperatures from —100° to 350°F or after repeated short term exposure to temperatures from —130° to over 500°F. That's why Silastic parts have proved so effective in actual service on the high flying Convair B-36.

The usefulness of rubberlike materials at extremely low temperatures can be established by the recently developed Gehman Flex Test Method (ASTM D1053-52T). Values measured according to this method on an extreme temperature Silastic and a synthetic organic rubber especially compounded for a low temperature service are plotted in Figure 1.



You will note that Silastic does not begin to stiffen until it reaches —50°F, and that it still has a twist value of 13.5 degrees at —130°F. The special low temperature organic rubber loses resilience at +50°F, and will take a twist of only 12 degrees at —22°F.

The usefulness of Silastic on the B-36 is increased by its excellent resistance to oxidation, weathering and to a variety of hot oils. In electrical applications, Silastic stocks are unique even among silicone rubbers for low water absorption and excellent dielectric properties, plus high physical strength.

That kind of performance is typical of Silastic, the Dow Corning silicone rubber. When you need flexibility or good dielectric properties in a resilient material that will withstand years of weathering or long exposure to temperatures far above and below the limits of ordinary rubbers, specify Silastic.

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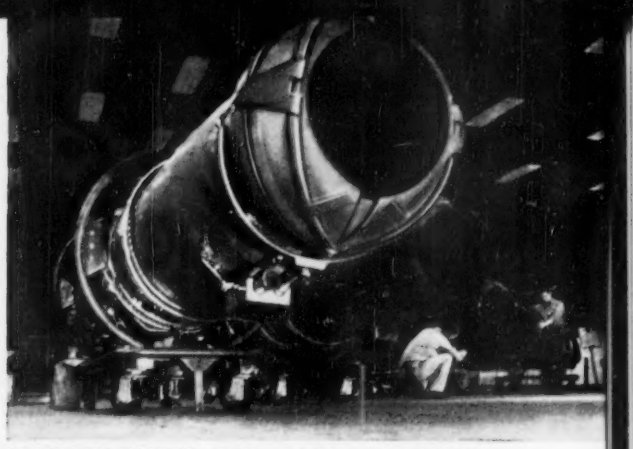
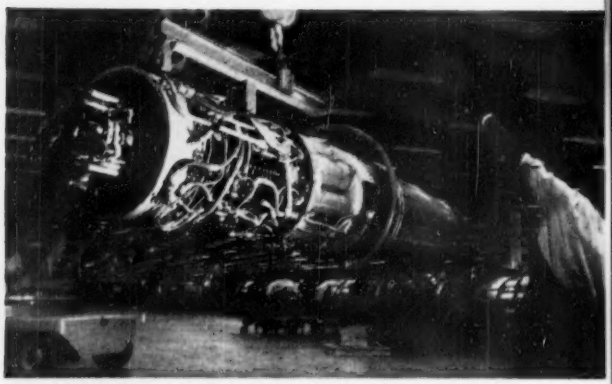
These and other B-36 applications for Silastic are more fully described in the March 30, 1953 issue of Aviation Week.

In Canada: Fiberglas Canada Ltd., Toronto — In Great Britain: Midland Silicones Ltd., London

ONLY ONE-MAN INTERCEPTOR in operation today, North American F-86D is powered by G-E engine which requires minimum pilot attention.



AUTOMATIC CONTROL of the variable area nozzle (illustrated above) regulates exhaust velocity and temperature.



MOST POWERFUL of J47 family, afterburner version gives F-86D Sabre Jet extra power to climb quickly for interception.

Easy-to-operate G-E Jet Engine Lets Pilot Concentrate on Interception

Electronic "Brain" Permits Complete Engine Control with Single Lever

INSTANT BURSTS OF POWER plus simplicity of operation make G.E.'s J47 with afterburner an outstanding powerplant for high-altitude interception. Powering the North American F-86D, America's first one-man rocket-armed interceptor, the afterburner version of the J47 is equipped with automatic electronic controls. For *any* throttle setting, the controls maintain *optimum engine performance under varying flight conditions.* This allows the pilot to focus his attention on his main job—*seeking out enemy aircraft!*

"SENSORS" FEED INFORMATION pertaining to engine pressure and temperature, air temperature, fuel-flow, and other variables into an electronic "brain." The brain compares power needs with engine performance. Adjustments, if necessary, are then made *automatically* as the "brain" controls fuel-flow and variable area nozzle on the afterburner.

AUTOMATIC ENGINE CONTROL is supplemented by other features such as anti-icing provisions which are essential to high-altitude interception. These engineering accomplishments have been factored into the J47 by G.E.'s design, development, and manufacturing organization—an organization that is actively proving that *"Progress is General Electric's most important product." Section 230-13, General Electric Company, Schenectady 5, N. Y.*

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Aviation Week

Volume 59 July 27, 1953 Number 4

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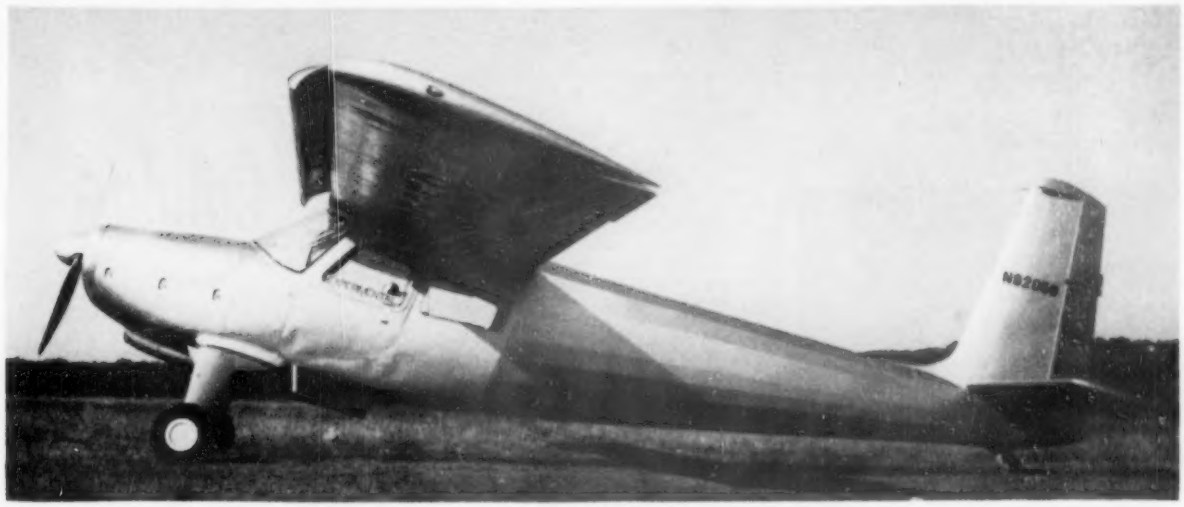

Helioplane Readied for Army Trials

First photo of the Helioplane YL-24 liaison plane which Army will get for field tests at Ft. Bragg, N. C. Note the plane's characteristic large-span leading-edge slats, long flaps and short, wide-chord ailerons. The YL-24 is especially designed for short-field operation and slow flying. It differs externally from earlier Helioplanes in having a different engine cowling with modified air intake.

Hiller to Help Build Doman H-31 Copter

Doman Helicopters, Inc., has signed a licensing agreement permitting Hiller Helicopters, Inc., to build the H-31, Doman's utility rotorcraft, AVIATION WEEK has learned.

The contract apparently resulted from a belief of the Army Transportation Corps that Doman's Danbury, Conn., facilities were insufficient for turning out quantities that may be required. It also indicates probability that Army will soon call for major production of the H-31.

The contract does not cover the LZ-5, commercial and export version of the helicopter, which Doman will continue to build.

For picture of new YH-31, see page 15.

Domestic

F-102 simulator will be developed by Link Aviation, Inc., Binghamton, N. Y., under a contract awarded by USAF.

TWA navigators called off their 12-day-old strike last week, and spokesman for Airlines Navigators Assn. (CIO) said the union would try to help the carrier resume normal trans-Atlantic operations—cut to 25% of normal by the July 10 walkout. An agreement signed by the airline with ANA provides that all navigators discharged during the strike will be reinstated with full seniority.

Lt. Guy P. Bordelon, of Franklin, La., became Navy's first ace of the Korean war last week when he shot down his fifth Yak 18 (AVIATION WEEK July 20, p. 22). Bordelon has been on loan from the Navy carrier U.S.S. Princeton to Fifth Air Force flying a Corsair. His assignment: knocking out the slow single-engine trainers which faster fighters couldn't touch. Navy awarded the pilot the Navy Cross.

First T-29D bombardier trainer has rolled off the assembly line at Convair's San Diego Div. It is scheduled for test flight soon after inspection by AF Contract Technical Compliance Board. The twin-engine Flying Classroom is equipped with a Type K bombsight, other classified electronic equipment and stations for seven students and instructors.

Aircraft industry reduced disabling injuries 23% last year to a rate of 4.21 per million manhours, cut time lost because of accidents 46% to 0.34 days per 1,000 working hours, National Safety Council reported last week. The safety organization presented its Award of Honor for accident reduction records to four Air Force commands: Strategic Air, Military Air Transport, Air Materiel and Alaskan Air.

Eastern Air Lines has ordered seven Model 501 Curtiss-Wright Dehemel electronic flight duplicators for delivery during the first half of next year. The duplicators are built around a single-seat cockpit which is equipped with basic instruments and controls that are used on transports.

Financial

American Airlines reports net profit after taxes for the first half of 1953 totaled $6,658,150, compared with $5,099,518 during the initial six months of last year. Total operating revenues were $98,849,516, a gain of slightly less than $12 million over the same period of 1952. American declared a dividend of $.875 on convertible preferred payable Sept. 1 to holders of record Aug. 15.

United Air Lines has declared a regular quarterly dividend of 25 cents per share of common stock, payable Sept. 15 to holders of record on Aug. 15. The regular dividend of $1.125 on cumulative preferred will be paid Sept. 1 to holders of record on Aug. 1.

International

Local service airliner has been designed by Aviation Traders (Engineering), Ltd., as a replacement for the DC-3. The British company reports its new Accountant transport will be built if there is sufficient backing and interest from airlines.

Need a Compact

RIGHT ANGLE DRIVE?

Perhaps the compact design of ANGLgears—they fit into the palm of your hand—will solve your problem. And these standardized right angle bevel gear drives have the capacity of units many times their size. Model R-300 is rated at 1/3 hp at 1800 rpm —Model R-320 at 1 hp. Both models have hardened gears and ball bearings, are lubricated for life. Both can be supplied with either 2 or 3-way extensions too.

ANGLgears are described fully in the I.A.S. Aeronautical Engineering Catalog. We suggest you refer to this publication for complete data.

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The Aviation Week

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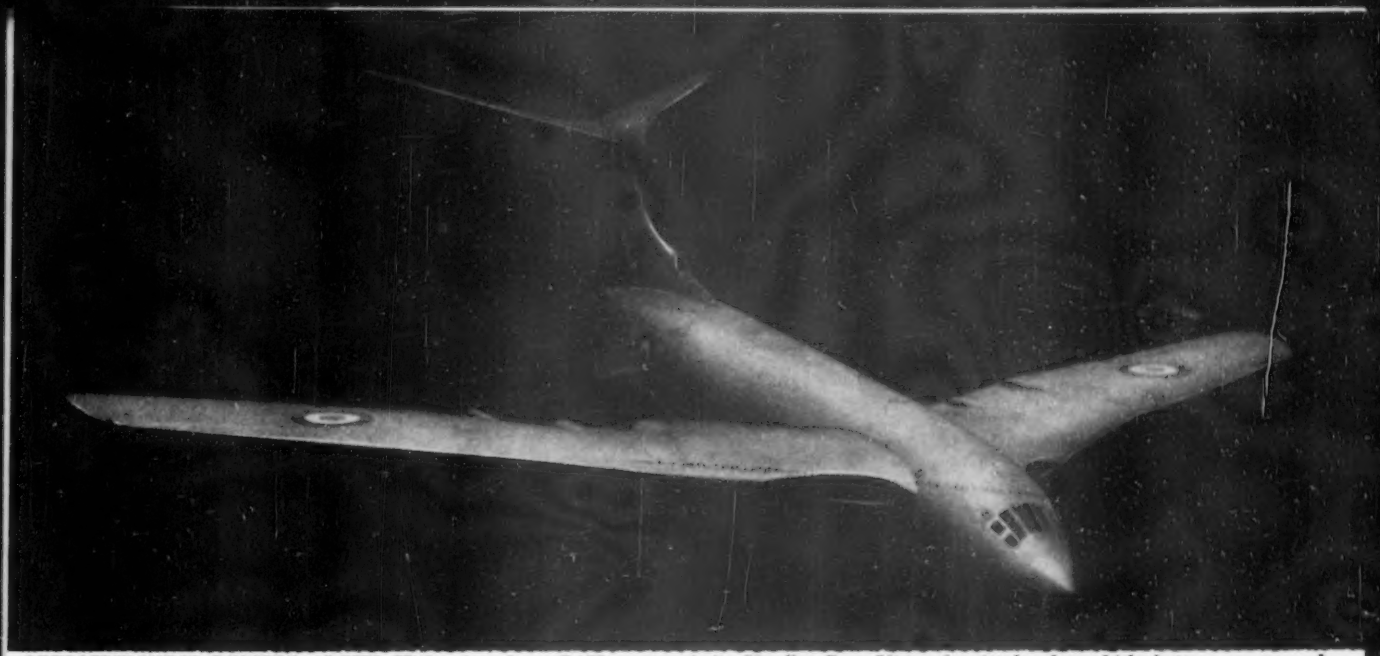


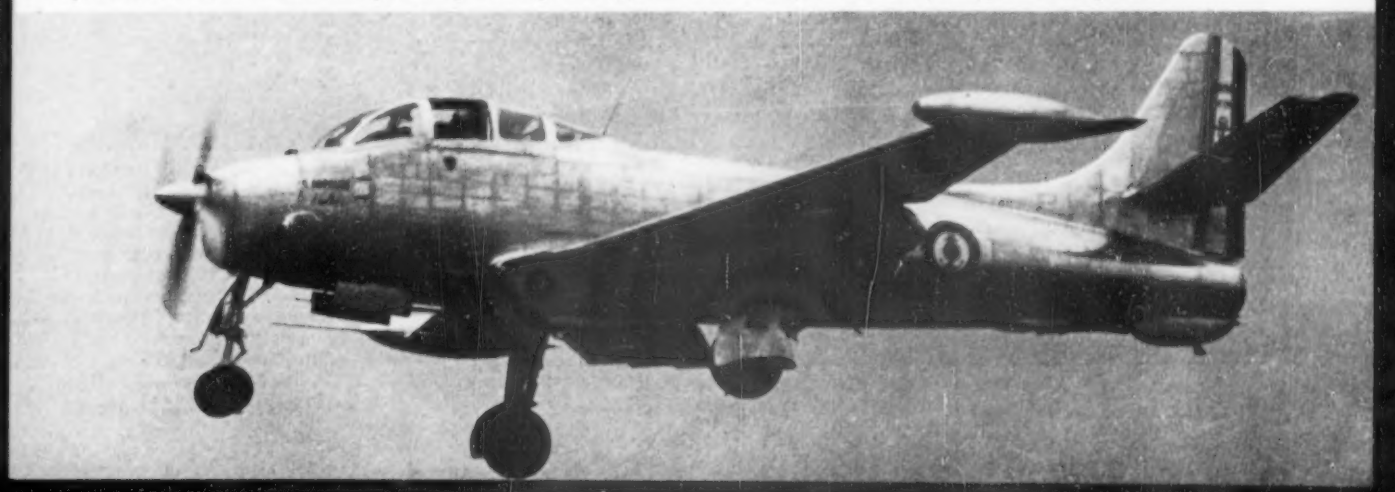
CRESCENT-WING BOMBER ALOFT—Flight view shows RAF's super-priority Handley Page Victor four-jet bomber which features an unusual crescent-shaped wing, reportedly giving it near-sonic performance at high altitude. Shape of the horizontal surfaces of the T-tail apparently is similar to the wing. The maker reports that the Armstrong Siddeley Sapphire-powered bomber was in the air six times in one day recently.

Foreign Military Jets Show Their Lines

Full picture page of new French transports, see page 80.

SUPERSONIC RESEARCHER—French S.O. 9000 Trident straight-wing research plane (above) takes off using its two wingtip-mounted 880-lb.-thrust Turbomeca Marbore turbojets. With its SEPR rocket motor (to be located in the tail) operating, the craft is expected to attain Mach 1.6.

NAVAL ATTACK PLANE—French side-by-side two-seat Breguet 960 Vultur (below) has an Armstrong Siddeley Mamba turboprop in the nose and a Hispano Nene in the tail. Maximum speed using both engines is approximately 545 mph. Two 960 prototypes are being tested.



INDUSTRY OBSERVER

► Pentagon observers expect F-84 production at General Motors' Kansas City plant will be phased out in 18 months.

► Air Research and Development Command is considering contract operation of its long-range missile proving ground at Patrick AFB, Fla., on a basis similar to the Aro, Inc., operation of Arnold Engineering Development Center at Tullahoma, Tenn. Pan American World Airways and Radio Corporation of America are conferring with ARDC on terms of the contract.

► Convair's XF2Y-1 Sea Dart, water-based delta-wing fighter, is reported to include reinforced plastics in its fin forward section, fuselage nose and a portion of the turtle deck. The wing leading-edge also is being considered for plastics application. (Story on Sea Dart public debut on p. 19).

► Chance Vought will open an engineering design facility in Boston Aug. 1 to employ an estimated 200. It will be auxiliary to the company's main engineering department in Dallas, which employs 1,500. Rapid growth of aircraft manufacturing in the Southwest has created a shortage of trained personnel in the Dallas area, and there is supposed to be a good supply of technical help in Boston.

► Aerojet Engineering Corp. is reported to have developed a reusable, liquid-propellant Rato bottle with controllable shutoff. Bottle's nozzle is of Niafrak, Carborundum Co.'s silicon carbide material bonded with silicon nitride to give high resistance to thermal shock. New bottle primarily is for military application, and reusable feature should save considerable bottle metal.

► Temco is going ahead with design of a successor to its T-35 Buckaroo trainer. Company feels producing other manufacturers' airplanes is a risky business (Aviation Week July 13, p. 14).

► Another recent Comet mishap occurred when RCAF's first jet transport undershot a landing at Torbay, Newfoundland. Rocks thrown against fuselage by landing gear caused "shrapnel-like holes," an RCAF officer says. Incident occurred during poor visibility and gusty winds. Damage was repaired quickly.

► Free-wheeling of the Boeing XT50 turboprop in the nose of Cessna's XL-19B caused some ground handling problems until someone came up with the idea of tying the propeller to a wing strut to keep it from spinning and creating a hazard for mechanics. Slightest breeze will spin the McCauley prop.

► Watch for American Airlines to use part of its upcoming DC-7 fleet on nonstop coast-to-coast service. Seven of the 25 DC-7s AA has on order will have a maximum gross takeoff weight of 122,000 lb., the others 116,800 lb. Heavier aircraft can be employed for deluxe cross-country service.

► Comparative transport operating costs reported by domestic airlines for the first quarter this year averaged, in direct cost per plane-mile including depreciation: Douglas DC-3, 46 cents; Douglas DC-4, 70 cents; Convair 240, 85 cents; Convair 340, 85 cents; Martin 4-0-4, 93 cents; Douglas DC-6, 93 cents; Douglas DC-6B, $1.00; Lockheed 749, $1.05; and Boeing 377, $1.83.

► Cost of the C-124 Globemaster has dropped from $9.8 million for the initial plane to $2 million on a flyaway basis, according to Air Force.

► More than 30,000 machine tools and major items of production equipment have been shipped to the industry from the Air Force reserve since the Korean outbreak. The reserve now totals 14,145 items valued at $168 million and is due to increase to 26,608 items valued at $319 million by next July. USAF's total inventory of tools will be 185,000 a year from now.

WHO'S WHERE

In the Front Office

Dan A. Kimball, former Secretary of the Navy, has been elected president of Aerojet-General Corp., subsidiary of General Tire & Rubber Co.

Roscoe A. Ammon is new president and principal stockholder of Marion Electrical Instrument Co., Manchester, N. H., succeeding **William F. McElroy,** who retires from active management but remains a director. **Herbert Schachat** has been appointed vice president-operations.

Wilbur A. Lazier has become vice president and technical director of research and engineering at Sprague Electric Co., North Adams, Mass. Also promoted: **Neal W. Welch,** vice president-sales; **Paul J. Crittenden** and **Hollis R. Wagstaff,** assistant treasurers.

A. P. Emmert, former president of Borg-Warner Corp.'s Warner Gear Div., Muncie, Ind., is new general manager of the Detroit Gear Div. **A. W. Rose** has resigned as vice president and assistant general manager of Warner Gear to become Pacific Coast representative of Borg-Warner.

Changes

Alfred T. Gregory is new head of research and advanced engineering at Fairchild Engine and Airplane Corp., Farmingdale, N. Y. **Emerson W. Conlon** has been appointed chief of development engineering.

Warren E. Alberts has been promoted to director of industrial engineering for United Air Lines; **B. B. Gragg** is new general manager-sales.

John W. Cole has been appointed chief of flight test at Piasecki Helicopter Corp., Morton, Pa.

Gordon E. Bullis has been named acting purchasing agent for North Central Airlines, succeeding **Stewart A. Lamb,** who resigned to join Heeb Co., Madison, Wisc.

Floyd Duffey has become manager of Transocean Air Lines' contract airlift operation for the Trust Territory of the Pacific Islands, a United Nations project.

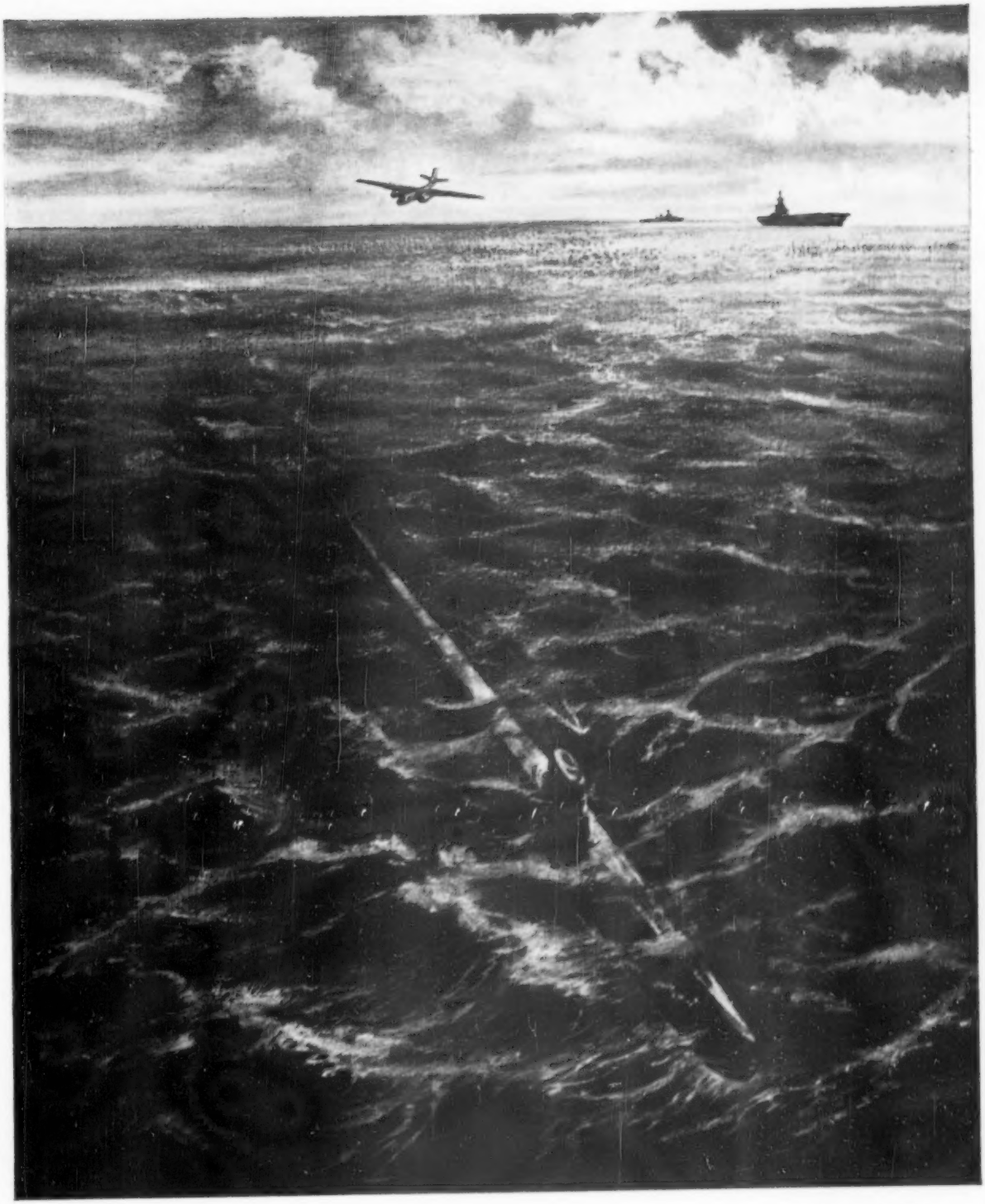
Donald R. McCann is new manager of Air Associates' Southwest Aviation Supplies Div., Dallas.

Carlos Milberg has been appointed assistant passenger sales superintendent of Pan American World Airways Latin American Div. Also promoted: **Robert M. Evans,** ground operations representative; **Herman G. Arndt,** New York accounting representative.

Honors and Elections

Joseph Pecoraro, of the Special Devices Center staff, Office of Naval Research, has won the first Arthur Williams Award, a new fellowship set up by the Flight Safety Foundation for study in human engineering.

Sidney M. Serebreny, PAR meteorologist, has received the San Francisco Junior Chamber of Commerce Aviation Achievement Award for pioneering research on the Pacific jet stream.



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AVIATION WEEK VOL. 59, NO. 4
JULY 27, 1953

USAF, Navy Aircraft Spending Outlook

Spending for aircraft and related procurement by Air Force and Navy will total $300 million more in fiscal 1954 than fiscal 1953. But under the program of Defense Secretary Charles Wilson, the upward spiral of spending will be checked: The peak spending of the USAF in the fourth quarter of fiscal 1953 gradually will be tapered during fiscal 1954, and Navy spending will level off. Unless the spiral is kept in check, USAF and Navy spending are expected to mount to more than $11 billion during fiscal 1955.

(In Millions)

	Expenditures, 1953 Fiscal Year					Unexpended Balance	New	Total Available For
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total	June 30, 1953	Money	Expenditure
Air Force	$1,276	$1,515	$1,592	$1,667	$6,050	$19,663	$3,495	$23,158
Navy	351	524	598	527	2,000	7,439	1,400	8,839
Total	$1,627	$2,039	$2,190	$2,194	$8,050	$27,102	$4,895	$31,997

	Expenditures, 1954 Fiscal Year					Unexpended
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total	June 30, 1954
Air Force	$1,650	$1,600	$1,550	$1,500	$6,300	$16,858
Navy	500	500	500	500	2,000	6,839
Total	$2,150	$2,100	$2,050	$2,000	$8,300	$23,697

SOURCE: Dept. of Defense estimates.

R&D Freeze Starts New Wilson-AF Feud

- **Twining pulls rug from under Vandenberg campaign to restore $1.4 billion to pared Air Force budget.**
- **But USAF challenges Defense Secretary's order to withhold 25% of research and development fund.**

By Katherine Johnsen

USAF's new Chief of Staff, Gen. Nathan Twining, has put the Air Force in firm support of Defense Secretary Charles Wilson's $11-billion USAF budget and pulled the rug from under the campaign launched by former Chief Gen. Hoyt Vandenberg to up it $1.4 billion.

But a new Air Force-Wilson feud is in the making—over Wilson's withholding of 25% of USAF's $475-million research and development budget for fiscal 1954. Air Force has been directed to budget only $365 million.

▶ **New Trends**—These were the developments:

• **In his first appearance** before the Senate Military Appropriations Subcommittee since taking over the Air Force reins, Twining volunteered that "after careful study" he is confident USAF can "make good progress" under the Wilson budget and that he considered a reevaluation of the 143-wing USAF program—as well as the force levels of Army and Navy—"essential."

This is the subcommittee, headed by Sen. Homer Ferguson, that was the launching ground for Vandenberg's attack on Wilson's $5-billion USAF slash in the $16-billion Truman estimate. Vandenberg insisted that there have been no significant changes in the world strategic situation nor in weapons development to warrant a reconsideration of a 143-wing goal.

• **Trevor Gardner,** special assistant to Air Force Secretary Harold Talbott, struck fire with pro-Wilson senators by boldly challenging Wilson's freeze of USAF's R and D funds while a survey of the program is made. Talbott testified that he "did not object to the resurvey," and, in a move to placate Michigan's Sen. Ferguson, said: "Nor does Mr. Gardner object to this restudy if it is properly done." Gardner, however, added: "If we get all the money back."

USAF already has appealed to Wilson to release some of the frozen funds for key projects. During World War II, Gardner, 37, served as top man for development engineering on rocket and atomic bomb projects with the Office of Scientific Research and Development and later as executive vice president of General Tire and Rubber Co. of California.

▶ **Van Loses**—Meanwhile, Vandenberg's request for a $1.4-billion addition to the $11-billion budget recommended by Wilson went down to defeat on the third Congressional showdown:

• **Senate Appropriations Committee** compounded the rejection by voting a USAF budget $40 million below the Wilson recommendation.

• **On the first test,** House Appropriations Committee voted a USAF budget $240 million below the Wilson budget.

• **The House,** by a sweeping 161-to-230 vote first turned down the Vandenberg proposal, then stamped approval on the Appropriations Committee's cut.

▶ **Senate Action**—Here are details on the Senate committee's actions:

• Approved the $3.5 billion recommended by Wilson for USAF aircraft and related procurement. This is the amount voted by the House.

• Voted to restore $15 million of the House's $21-million trim in the $1.4 billion recommended by Wilson for Naval procurement of aircraft and related equipment.

• Restored the $35 million the House trimmed from the $475 million recommended by Wilson for USAF research and development.

• Sustained the $18-million cut made by the House in the $175 million recommended in the Wilson budget for

Naval Aviation research and development.

• Slashed $250 million off the $500 million requested by Defense Department and approved by the House for building up a mobilization base of reserve tools and facilities.

The committee said it "feels that this program, without question, is one of the most important in the entire national defense effort since it consolidates under the control of the Secretary of Defense funds for the procurement of plants, tools, and production equipment for mobilization reserve purposes. However, from the testimony presented, it does not appear that plans have been sufficiently developed to warrant a larger appropriation at this time than the $250 million. . . ."

• Tossed out a House provision aimed at cutting operational expense which would limit flight time of desk officers to 48 hr. a year. USAF and Navy protested that this was not sufficient to keep up pilot proficiency. The committee set 100 hr. a year, heretofore considered the minimum, as the maximum.

▶ **Budget Comparisons**—The $11.2-billion USAF budget approved by Senate appropriations, slightly ($40 million) under the Wilson recommendation, compared with the $16 billion recommended in the Truman budget and USAF's fiscal 1953 appropriation of $21 billion.

The $2.3-billion Naval Aviation budget proposed by the Senate committee, $24 million below the Wilson recommendation, compares with the $3.3 billion recommended in the Truman budget and Naval Aviation's fiscal 1953 budget of $4.4 billion.

▶ **Twining Views**—This is the statement volunteered by Twining at his Senate Appropriations Committee appearance which set off a tug-of-war between pro-Wilson and pro-Vandenberg senators over his support:

"Throughout the process of the budget making up to the present time, I have naturally had serious concern with regard to what I believe are essential Air Force requirements. I am satisfied, however, after careful study, that under the budget presented to Congress requesting approximately $11 billion, the Air Force can make good progress toward what is still the ultimate goal of 143 wings.

"I shall soon be engaged as a member of the Joint Chiefs of Staff on a study and review of the military requirements and capability in light of the present world situation. Whether this study will indicate a substantially larger Air Force program than the present interim program of course, I cannot say.

"I regard a restudy of our requirements and capabilities as an essential step in determining what forces we should have. I willingly accept the interim program."

Under prodding by Sens. John McClellan, Lister Hill, and Burnet Maybank, who have supported the Vandenberg request, Twining reported that "some delay" in the USAF buildup would be involved in the restudy. But he balked at opposing it on the score. "I think we should never get in a position of staying rigid on any type of force," he commented. "We must be flexible and take a look at them every year and with regard to new weapons and new machines and everything else, and go up or down according to the long-range situation."

▶ **Twining Reversal**—Hill pointed to Twining's testimony at the time of his confirmation that he considered a 143-wing USAF "necessary" to security. "At that time, that is what I thought," Twining explained. "But now we are going to have a review and go into the matter completely and we may come up with a different answer."

The USAF Chief maintained, under persistent questioning, that there was "no persuasion brought to bear" on him to support the Wilson program.

▶ **R&D Quiz**—Gardner's skepticism of Wilson's withholding of 25% of USAF research and development funds while a survey is made, also touched off tugging between pro-Wilson Sen. Ferguson and pro-Vandenberg Sen. Hill. The quizzing went:

Ferguson: "You say you are going to be satisfied if you get all the money back?"

Gardner: "That is right."

Ferguson: "You are not going to be satisfied if you do not?"

Gardner: "That is correct."

Ferguson: "And you think that is your province in your present capacity?"

Gardner: "That is my opinion, sir. It is not necessarily my province."

Ferguson: "I do not have any objection to your having an opinion."

Hill: "Would you be satisfied with the loss of valuable time (while the survey is being made)?"

Gardner: "I would not."

Ferguson: "Do you think that you have the capacity to determine what projects should go forth in research for the Air Force?"

Gardner: "I think my boss (Talbott) should answer that question, sir."

Talbott quelled the session by volunteering that he did not think Wilson would withhold the 25% for "very long."

Gardner made these points in his testimony:

• The $537-million level proposed in the Truman budget provided for "continuation of essential weapons systems and an adequate level of technical development. But it did not provide for the initiation of certain desirable new weapons systems."

• If the R and D program is reduced below the $475-million level "this action would call for the elimination of practically all new aircraft and engine prototypes as well as the cancellation or major slowdown in critical weapons systems now under development."

TALBOTT PREPARES FOR STRATOJET HOP

During a visit to the USAF Flight Test Center at Edwards AFB, Calif., Secretary of the Air Force Harold E. Talbott (center) took a flight in a Boeing B-47 Stratojet bomber. In this photo, taken just prior to the hop, Talbott has his flight gear adjusted by Maj. James Gallagher (left) and the test center's commander, Brig. Gen. J. Holtoner.

AF Balances Planes and Plants

New policy sets up review of industrial program to fit lower budgets but insure modern, effective force.

USAF has come up with a long-range policy to tailor its entire industrial structure to insure a modern, effective yet economical Air Force to fit lower budgets.

It is called the Air Force Production Reserve Policy (AFPRP) and is designed to maintain a consistently balanced industrial structure sufficiently elastic to contract or expand whenever and wherever necessary.

► **Contract Review**—Armed with this policy, Air Force is conducting an item-by-item review of its entire industrial production program. The policy has evolved over the past two years, a period of extreme stresses and strains, as USAF attempted to match its industrial program to the accelerated, then stretched-out, production picture.

All prime contractors, subcontractors and licensees will be subject to review under AFPRP. With review will come adjustments. Some firms will be expanded while others are contracted, whichever the USAF experts feel is necessary to tailor the industrial structure.

► **Seven Principles**—Air Force has laid down seven basic principles under which it will determine the firms to be retained in its industrial program and what it will require of newly selected contractors in the future. A company:

- **Must have management** and technical knowledge required to accomplish efficiently and successfully the production task to be assigned.
- **Must have facility** and equipment capacity required both as to quality and adequacy.
- **Should be so well financed** that it will need only to supplement its capital and not expect to rely completely on various forms of government assistance.
- **Must have sufficient reservoir** of manpower with the ability and skill required for efficient production.
- **Should not be established** if it falls below the requirements of a minimum economic production unit.
- **Should not be given** more business than it can handle efficiently.
- **Which produces some items** that require very special skills or are highly classified may introduce additional important factors that will be considered.

AFPRP provides for retention of existing capacities to the fullest extent where consistent with economic considerations, the design and development capacity of the supplier and his mobilization potential.

► **To Retain Standbys**—In cases where a company's facilities are not required for current or projected programs, Air Force intends to retain the facilities in a degree of standby compatible with the mobilization urgency of the products it can produce.

Every existing policy and program dealing with industrial resources, security and mobilization will be re-examined.

Revisions, where they are necessary in order to conform to AFPRP, will be made.

Generally, contractors who have special design and development capabilities will get priority as far as retention of their facilities is concerned. If economically practicable, multiple sources on a one-shift basis will be retained. AFPRP calls for special consideration for expansibility in cases of dual-purpose plants, such as airplane and auto production under one roof.

► **Eye on Mobilization**—If a contractor's production is below an economical sustaining rate, his facility will be used in maintenance programs or in modification of the same or related end item whenever practicable. The capacity of present end-item producers will be retained by using them as subcontractors where feasible.

Producers relieved of Air Force contracts will be kept up to date on their former projects in cases where their product is a critical item in time of mobilization.

In such cases, machinery and equipment will either be left in place, preserved and maintained in a state of constant readiness or stored in or near the plant and preserved.

► **Reserve List**—Where this is impracticable, equipment will be shipped to central storage sites. Government-owned plants becoming idle will be maintained in reserve or may be leased or sold on a recapture agreement. Air Force prefers to use such plants rather than let them stand idle.

AFPRP also provides for the geographic dispersal policy to be retained wherever economically reasonable.

From the existing production structure, a source pattern of greater proportion and capability than actually required is to be retained as long as it is economically feasible.

► **Source Pattern**—A source pattern consistent with the characteristics and importance of the product and national security is to be created for new aircraft and related equipment programs in excess of current requirements.

An additional reserve of special long lead time machine tools is also provided in the policy to further insure rapid expansion in event of any national emergency. This facet of the policy, however, is dependent on what moneys Air Force will get of the total appropriation slated for "reserves, tools and facilities" in Defense Department's 1954 budget.

This House-approved appropriation has been slashed in half by Senate Appropriations Committee and was to be voted upon last week in Congress.

Aircraft Industries Assn. spokesmen say the latest mobilization policy is "by and large a good one." They add that no detailed study of the program has yet been made by AIA. Months of study probably will be required. But on the surface, says AIA, AFPRP looks like a "sound, workable policy."

NEW DOMAN FLIES WITH EIGHT ABOARD

Doman YH-31 helicopter settles down at Danbury, Conn., after initial flight with seven passengers and a pilot aboard. This is the first flight view of the new craft showing the cockpit cab in place. The copter is currently undergoing Civil Aeronautics Administration tests. Civil version of the YH-31 is designated the LZ-5. Both models have an empty weight of 2,860 lb. Useful load for the YH-31 is 1,559 lb., and for the LZ-5 2,140 lb. Powerplant is a Lycoming SO-580-D of 400 hp. Four-blade hingeless main rotor is 48 ft. in diameter. See p. 7 for story on Doman-Hiller H-31 pact.

Comet Crashes

- **Dakar accident boosts jet transport toll to four.**
- **Plane landed long and fast on wet runway.**

Landing crash of a French airline Comet 1A at Dakar, Africa, brings the tally of destroyed de Havilland jet transports to four.

No one was injured in the crash of Union Aeromaritime de Transport's Comet June 25, but the fuselage was twisted beyond repair. Flight carried approximately a half load of passengers, 10-15. UAT is cannibalizing major parts of the plane.

▶ **Hot Landing**—Approaching Dakar at dawn in drizzling rain with only fair visibility, the Comet landed fast and far down the wet runway, observers report.

Intermittent skid marks indicated the pilot applied brakes but could not stop. Plane overran the runway and rolled some distance before a concrete abutment tore off the landing gear.

▶ **Contributing Cause**—French and British embassies in Washington say they have no details on the accident nor progress reports on the investigation. However, qualified pilot observers who inspected the scene and spoke to witnesses report several possible contributing causes:

- **Comet braking relies** solely on wheel brakes. Some other jet types also have a parachute brake, and most propeller-driven transports have reversible props.
- **Wet runway reduces** effectiveness of wheel brakes; tires tend to skid on wet pavement.
- **Landing approach** appeared high and fast; touchdown was long.
- **Runway lighting and marking** typical of African airfields, may have given the pilot insufficient indication of how near he was to the runway threshold during approach, how little runway was left after he touched down.

UAT put its first Comet 1A into scheduled operation (Paris-Casablanca-Dakar) Feb. 19. Two more Comet 1As are on order.

▶ **Comet Record**—Other Comet crashes:

- **Rome takeoff.** British Overseas Airways Comet 1, taking off at Rome last October, failed to become fully airborne. Pilot aborted the takeoff, shut off engines and belly-landed beyond the runway's end.

There was no fire, and no injuries, but the plane was wrecked. Cause was attributed to attempting takeoff in a nosehigh, semi-stalled attitude.

Comet handling at critical speeds requires precision-instrument technique because of absence of "feel" in the transport's hydraulically boosted controls (AVIATION WEEK July 20, p. 71).

- **Karachi takeoff.** Canadian Pacific Airlines Comet 1A was taking off from Karachi, Pakistan, Mar. 3, also failed to become airborne. But the pilot attempted to complete the takeoff.

With all four engines at full throttle, the Comet rolled some distance beyond the runway, hit an obstruction and exploded—killing all 11 aboard, including five de Havilland technicians.

Basic cause was judged as identical to the Rome crash: attempting takeoff with nose too high. In both cases, the nose was lifted off at such a steep attitude that the tail struck the runway. Such an attitude greatly increases drag, tends to stall airflow over the wing.

- **Calcutta storm.** A BOAC Comet 1 flew through a violent electrical storm May 2 shortly after takeoff from Calcutta, India, and plunged to earth 20 mi. away, killing all 43 aboard.

The India Board of Inquiry speculated that the same lack of "feel" in the controls caused the pilots to overstress the plane in correcting violent changes of attitude in the storm.

Narrow Escape

(McGraw-Hill World News)

Bombay—A British Overseas Airways Corp. Comet narrowly escaped crashing July 16 at Bombay during a downwind landing made by mistake on a 3,600-ft. runway at Juhu Airport.

The pilot had been instructed to land on a near-parallel runway two miles away at Santa Cruz International Airport.

The Comet's captain realized his mistake as the jet transport touched down with 900 ft. of runway and a 12-knot tailwind behind it. He applied full brakes from the moment of landing, covered the final 300 yards in a side skid that blew out the jet's eight tires.

The BOAC Comet stopped 10 ft. from the end of the runway. Neither passengers nor crew members were injured.

Observers called intact condition of the transport a tribute to Comet's strong undercarriage.

F-86D Sets Speed Record of 715.7 Mph.

El Centro, Calif.—Lt. Col. William Barns, USAF, set a new world speed record of 715.697 mph. July 16, shattering the old mark twice in one hour with an F-86D. The exact figure is subject to official certification.

Streaking over a measured 3-km. course on the eastern shore of California's inland Salton Sea, Barns—Air Force representative at the North American Aviation plant—topped the former 698.5 mph. record in two four-pass assaults.

His F-86D, powered by an improved GE J47 engine equipped with afterburner, carried a full combat load of 24 rockets. The more powerful J47 is reported to get its added thrust as a result of ceramic coating in the afterburner permitting it to operate at higher temperatures.

Barns skimmed the measured course at an altitude of less than 100 ft. above the Salton Sea (236 ft. below sea level).

▶ **Temperature Edge** — Temperatures ranged from 100 to 105 deg., giving the Air Force pilot a large margin between his top speed and the compressibility fringe of the sonic area. Sonic speed at existing temperatures would have been 794 mph. on the first passes and 797 mph. on the second runs.

Last November, 75-deg. temperatures in the Salton Sea area held the speed of Capt. Slade Nash of Edwards AFB under 700 mph. when he set the previous world record over the same course in the same-type aircraft.

▶ **Two Attempts**—Two assaults on the record were planned to take advantage of varying heat conditions.

First passes, made just before noon, were in heavy turbulence at 100-deg. temperatures. Speed attained was 713.6 mph., sufficient to shatter the previous mark of 698.5 mph.

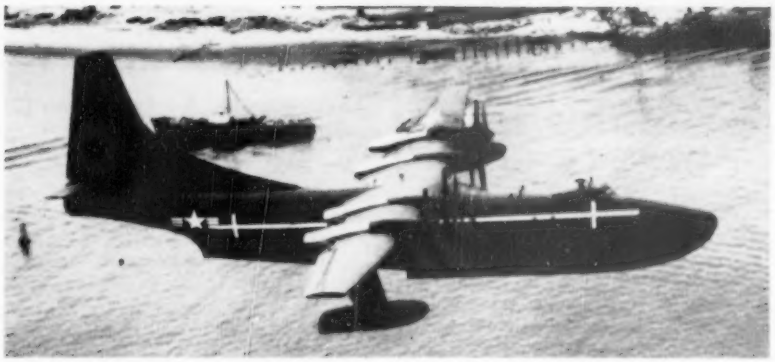
Less than an hour later another attempt was made in 104-105-deg. temperatures with less turbulence. Four passes of the second run averaged 715.679 mph. to shatter the record for the second time.

Barns, 32, Air Materiel Command production test pilot, thus became the first pilot to break an official world's speed record twice in one day. Flights were timed by the National Aeronautics Assn.

The AF pilot took off from El Centro Naval Auxiliary Air Station, 40 mi. from the speed course. He was required to remain below 500 meters (1,640 ft.) for the entire flight and below 100 meters (328 ft.) for the measured run.

▶ **Pilot Switch**—The Air Force offered no explanation of a last-minute shift of pilot assignments between Barns and Brig. Gen. J. Stanley Holtoner, commanding officer of ARDC's Edwards.

Barns originally was selected for the speed run. A week before the flight his orders were rescinded and the assignment given to Gen. Holtoner. Holtoner practiced over the course for three days before the assault but, at the last minute, the assignment was returned to Barns.



Tail Trim Fails, XP5Y Crashes

San Diego, Calif.—Crash of Convair's giant turboprop XP5Y-1 seaplane six miles off the California coast July 15 was caused by longitudinal instability resulting from failure of the tail trim mechanism, company sources report.

Nine crew members, who rode the plane through half an hour of erratic gyrations, parachuted to safety moments before the aircraft crashed into the ocean and sank.

Navy clamped a tight security lid on the loss of its first turboprop seaplane.

▶ **No Turboprop Trouble**—The Allison T40 turboprop engines, which had caused trouble on earlier flights of the experimental aircraft, were operating properly at the time of the accident and had no connection with the crash, a company official says.

The XP5Y-1 was powered by four of the T40 models, which consist of two T38 engines linked to counter-rotating propellers in a single nacelle. The Convair seaplane thus actually was an eight-engine aircraft, although mounting only four nacelles.

▶ **Control Lost**—Pilot D. P. Germeraad reported he began to lose control of the aircraft at 3 p.m., when it started into a series of almost-vertical dives and climbs. Structural integrity of wings and fuselage was good under severe strains well above design limitations, he said.

For 25 min., he and the crew remained with the aircraft until satisfied all control was lost. Then they parachuted just before the XP5Y-1 dove into the sea at 3:28 p.m. At one point during the wild flight, the giant seaplane climbed 5,000 ft. straight up, according to reports.

▶ **R3Y Prototype**—No attempt will be made to salvage the aircraft, Convair officials say.

The crash occurred on the 42nd flight of the seaplane, which had logged more than 100 hr. of prototype testing.

The XP5Y-1 was the prototype of the Navy R3Y turboprop transport now in production at Convair. No delay in production is contemplated as a result of the XP5Y-1 crash, company officials say. A second prototype has been completed but not flown due to delay in obtaining engines.

▶ **Crash Photos**—Film of the XP5Y-1's erratic flight and crash was studied by Convair technicians. A chase plane awaiting an experimental flight of Convair's XF2Y water-based jet fighter was diverted to the XP5Y-1 scene, six miles off Point Loma, and filmed aviation's first turboprop transport crash. Navy classified the film secret.

The XP5Y-1, first flying boat designed under the new hydrodynamic philosophy of high length-over-beam ratio, made its maiden flight in April 1950. Prior to its final flight, it had logged 101 hr. 29 min. in the air.

Convair reports its speed was in excess of 350 mph. and performance better than World War II fighter aircraft.

Navy Plans Purchase Of 96 Super DC-3s

Navy plans to convert 96 more Douglas DC-3s (R4Ds) to Super DC-3s (R4D-8s) at a cost of $28 million. Douglas Aircraft Co. recently made similar conversions of 98 R4Ds under a contract let three years ago.

Navy says at $300,000 cost per conversion it gets a plane that would cost $600,000 to build new. Money is earmarked for complete conversion of 48 planes immediately and purchase of all parts necessary to modernize 48 more.

Vice Adm. Thomas Combs, former Chief of BuAer, told the Senate Appropriations Subcommittee, "We already have modernized 98 of this transport class and the results have been so favorable that we want to continue the program."

Main changes made are installation of a completely new wing and vertical fin, conversion to the Wright R1820 engine, and lengthening of the fuselage. Payload is 12,000 lb., and the plane can carry a smaller payload over the critical 2,400-mi. San Francisco-Honolulu route.

LeMay Gagged?

- **SAC chief shies from AF budget fight in speech.**
- **But he tells IAS meeting big bombers are vital.**

By William J. Coughlin

Los Angeles—Gen. Curtis E. LeMay, commander of the Strategic Air Command, passed up a chance to put his views of the present Air Force budget on record when he addressed members of the Institute of the Aeronautical Sciences at their annual summer meeting this month.

The Pentagon saw to that.

▶ **Censored Speech**—"A great percentage of you, I realize, are directly involved in classified projects in the research and development fields for the Air Force," Gen. LeMay told the group. "But as much as I would like to talk along these lines, I think you will appreciate that it is necessary for me to deal only with unclassified information."

The SAC commander paused for a long moment. Then he added with great feeling a remark that was not in the advance text of his speech:

"I doubt also if this is the time and place to discuss this year's Air Force budget."

The general did not tell his audience the Pentagon had censored his speech. But his off-the-cuff remark left little doubt just how LeMay feels about this year's Air Force budget.

▶ **B Production**—Gen. LeMay warned his audience that U.S. defenses are incapable of stopping a "determined, well-planned and coordinated bombing attack," no surprise to the well-informed members of the institute. He discussed in broad terms SAC's organizational setup, asked the scientists to do something about radar malfunctions that "account for over 50% of our non-effective sorties."

He added a chorus from the SAC theme song: "Our long-range atomic bomber force with its formidable power has been the indispensable deterrent to aggression these past few years, the force that has kept the peace."

But many members of the audience felt that LeMay's speech, graded in the terms of nearby Hollywood, was a B production. The best part of it had been left on the cutting room floor.

▶ **No Sounding Board**—The distinguished audience which the cigar-chewing SAC commander did not use as a sounding board included Lt. Gen. Laurence C. Craigie, USAF deputy chief of staff for development; Lt. Gen. E. W. Rawlings, commander of the Air Materiel Command; Maj. Gen. Donald L.

Putt, new commander of Air Research and Development Command; and retired Lt. Gen. James H. Doolittle.

Industry representatives included Jerome C. Hunsaker and Hugh L. Dryden, National Advisory Committee for Aeronautics; J. L. Kindelberger, North American Aviation; Jack Northrop; Clark Millikan, California Institute of Technology, and many other names well known in aviation.

▶ **Wright Biplane**—Gen. Doolittle dedicated the institute's full-scale replica of the original Wright brothers airplane, unveiled at the Hotel Statler banquet. Later the replica was hung in the auditorium of the IAS building.

The aircraft, an exact duplicate of the Kitty Hawk airplane, was constructed through the cooperation of 24 industry members and assembled by the Northrop Aeronautical Institute. The project was conceived by E. W. Robischon, manager of the western region of IAS, and coordinated by Lockheed's F. A. Cleveland.

▶ **IAS Awards**—The annual Octave Chanute Award was presented to Douglas test pilot William B. Bridgeman for his flights in the D-558-II. Benjamin F. Greene, Jr., electronics specialist with the Air Force research center at Cambridge, Mass., received the annual Thurman H. Bane Award.

▶ **50-Year Span**—Helicopters received a large amount of attention in the IAS seminars with papers delivered on the McCulloch MC-4, Hughes XH-17, American Helicopter XH-26 and Hiller YH-32.

Many of the papers read were devoted to aerodynamics and propulsion in the supersonic range. A confidential session discussed guided missiles.

From the Wright airplane hanging from the ceiling to discussions on the auditorium's floor, it was only a few feet. But the span between the aircraft and the convention also was 50 years. The Wright brothers would have been pleased at the progress.

Navy to Test Steam Catapults on Carrier

Navy is building two steam catapults for its flush-deck carrier, U.S.S. Forrestal, one at Philadelphia Naval Air Material Center, the other at Naval Air Test Center, Patuxent River, Md.

At Philadelphia, Navy is building a catapult patterned after the British version. It is scheduled for tests in September. At Patuxent River, an American modified version of the British development is expected to be ready for testing by April.

Chief asset of the steam catapult is its economy compared to the hydraulic types now in operation aboard fleet aircraft carriers.

Plant Expansions

Air Force plans to spend $9.3 million more in expanding capacity of Consolidated Vultee Aircraft Corp.'s San Diego plant for F-102 production and $8 million more at Douglas Aircraft Co.'s Long Beach, Calif., plant for B-66 production. USAF already has authorized a $13.6-million investment in facilities at the Convair plant and $5.1 million at the Douglas plant.

Tobey Orders Review Of Civil Air Laws

Chairman Charles Tobey of Senate Interstate and Foreign Commerce Committee has set up a three-man subcommittee to review air transportation law and determine whether it is up-to-date and protecting the public interest.

Headed by Sen. John Cooper, the group includes Sen. Edwin Johnson and Sen. Dwight Griswold. Frank Keenan will handle staff work. After three years of graduate work in economics and political science at Harvard University, Keenan served briefly with the Senate Small Business Committee, then joined the Commerce Committee staff where he has served for more than two years.

The subcommittee is expected to put emphasis on statutes affecting competition in air transportation, which will bring up the question of the role of nonskeds.

J65 License Costs Wright $499,800

Wright Aeronautical Corp. is paying Armstrong Siddeley Co., Ltd., $499,800 for rights to build the J65 Sapphire engine. Cost of the licensee agreement was revealed in Senate Appropriations Subcommittee testimony.

In addition to the flat fee, the British engine firm will receive $62.50 for each engine produced by Buick Motor Division of General Motors Corp., second-source producer.

Testimony brought out that Air Force had paid $12.3 million for the Sapphire project. Sapphires power the F-84F and RF-84 which are being supplied North Atlantic Treaty Organization nations.

Col. John L. Zoeckler, USAF deputy director for aircraft programming, revealed that original design of the Sapphire included aluminum blades which the British found later "to their dissatisfaction . . . were no good." American designers, he said, had to convert the first three aluminum stages to steel in order to make it an acceptable design.

NAA Union Demands Wages at Auto Level

Los Angeles—North American Aviation's 26,000 members of United Auto Workers (CIO) are preparing to strike if necessary to enforce demands for auto-industry wage levels, union officials disclosed to AVIATION WEEK.

With International Association of Machinists (AFL) contract terminations due almost simultaneously at Lockheed, Douglas-El Segundo and Douglas-Santa Monica, the decision foreshadows another round of wage battles for the industry this fall.

The two unions for the first time will work closely in outlining collective bargaining strategy for the aircraft industry, according to experienced labor sources.

▶ **Higher Pay**—A UAW-CIO strike would halt military production at NAA's Los Angeles, Fresno and Columbus plants. Both civilian and military production would be affected at Lockheed and Douglas.

"It is our chance to come up to status with the auto industry, where work is similar and pay greater," said Paul Schrade, president of Los Angeles UAW Local 887. "The auto industry, second-source producer of aircraft, is paying higher wages than the aircraft industry itself."

▶ **Major Demands**—Union officials listed four major demands they will bring up at NAA contract discussions. They had returned from a July 10-13 meeting in Columbus of officers from the three locals. NAA contract expires Oct. 22, and bargaining sessions must begin before Sept. 2.

Union negotiators will take these demands into the meetings:

- **Elimination** of the present 22-cent-an-hour differential between auto and aircraft wages. Union will ask for a 22-cent pay boost but is willing to reduce that amount if certain C and B level jobs are reclassified. Such a move would have the same overall effect as a pay increase.
- **Severance pay—pension program** calling for a maximum of $1,500 severance pay for 10 years' service at $150 annually and a pension plan scaled down from a maximum of $66 per month for 30 years' service at age 65.
- **New health plan,** with the union seeking joint administration of funds and joint selection of the carrier. Union is dissatisfied with the present plan.
- **Major contract revisions,** including eight paid holidays in place of six, full union shop and improved grievance procedures.

UAW-CIO represents 17,000 NAA workers in Los Angeles, 15,000 in Columbus and 1,100 in Fresno, Calif.

Subsidy Transfer

Airline subsidy transfer from Post Office to Civil Aeronautics Board budgets started breezing through Congress as expected last week.

It goes into effect automatically unless Congress vetoes it.

The President's reorganization plan won unanimous approval of the House Subcommittee on Government Operations. Resistance expected from advocates of a complete new subsidy law failed to materialize.

Payments, now running $80 million a year, would come from CAB starting the final quarter of this year. Assuming the plan goes through, the Board will testify in behalf of its subsidy commitments before congressional appropriations committees next year for the first time.

Navy Drops Wraps Off Convair Sea Dart

San Diego, Calif.—Convair's Sea Dart made its public debut here last week.

Riding its hydro-skis like a water-skier on its 4,000-ft. takeoff run, Navy's supersonic fighter then climbed sharply to 500 ft. and flew over San Diego Harbor for 20 minutes. The delta craft made its landing at about 100 mph. and took about 2,000 ft. to stop.

Sister ship of Consolidated Vultee's F-102 Air Force fighter, the Sea Dart is designed to attain "comparable speeds," according to Ernest G. Stout, Convair staff engineer-hydrodynamics. The plane is powered by two Westinghouse J34 jets with afterburner, one engine on each side of the fuselage. More powerful jets are slated to be installed later, with the Pratt & Whitney J57 mentioned as one of the more likely engines.

Convair is reported to have a limited production contract for the fighter.

The Sea Dart rides down the ramp on a tailwheel and a pair of wheels fitted into the rear of the hydro-skis. It sits low in the water, with the hydro-skis extended below the surface. Almost immediately after the takeoff run begins, the craft rises onto the skis, which throw a bow wave away from the plane. Both in taxiing and in highspeed runs, the spray pattern is such as to keep debris away.

► **Stable and Controllable**—After the demonstration, the test pilot, E. D. Shannon, praised the plane's flight stability and controllability in the water. The wings, which ride just above the water in taxiing, dip in turning, providing stability for water maneuvers.

The hydro-skis, retracted immediately after takeoff and before landing, are mounted on oleo struts. They contribute materially to the plane's supersonic capabilities, eliminating the need for bulky float gear and complicated retraction equipment.

In landing, the skis are extended at an angle of attack that appears greater than that of the plane.

Apparently to protect the security of the hydro-skis, Navy prohibited the press from taking closeup shots of the plane. Newsreel photographers had the long-range lenses of their camera turrets taped up as a precaution. The demonstration was viewed from a Navy LST in the bay, and at no time were newsmen permitted closer than 200 ft.

The Sea Dart cockpit is equipped with a clam-shell canopy. The delta craft is somewhat larger than the XF-92A but smaller than the F-102 prototype now under construction at Convair-San Diego.

Grounded Scorpions Return to Service

Air Defense Command is flying the F-89 again. Extensive wing modifications ordered on all models of the Northrop Scorpion have been completed on some of the aircraft and they have been returned to service.

Scorpions were grounded last fall following crashes at the Detroit Air Show and at Newburgh, N. Y. Air Force investigators found that the interceptor's thin wings needed reinforcement near the fuselage.

However, Air Force points out the aircraft was not grounded "in the strict sense." If F-89s had been needed by ADC, they would have been flown whether the modification had been made or not, USAF spokesmen explain. The same holds true now.

Meanwhile, modification is continuing at Northrop's Hawthorne, Calif., plant where the firm is preparing to phase out F-89 production.

Services Boost Plane Overhaul Contracts

Army, Navy and Air Force have earmarked $327 million for aircraft overhaul contracting with private firms in fiscal 1954, but this program may have to be scaled slightly if Congress cuts operations funds. It is a significant increase over the $168 million in aircraft overhaul contracting by the three services in fiscal 1953.

The $327 million is approximately 40% of the total allocation of $811 million for aircraft overhaul. USAF and Navy have set aside $484 million for work at their own depots.

Here is a breakdown:

- **Air Force, $287 million.** This compares with $150 million for contract work last year. USAF's allocation for depot overhaul is up from $310 million in fiscal 1953 to $320 million.
- **Navy, $38 million.** This is a substantial increase in the $17 million in private contracting done by Navy last year. But Navy is continuing its policy of concentrating aircraft overhaul in its own facilities, earmarking $163 million for depot work, compared with $160 million last year.
- **Army, $1.6 million.** This compares with $410,000 in contract overhaul performed for the Army in fiscal 1953. Depot overhaul for the Army is done at USAF facilities and included as part of the AF program.

FLY-BY-NIGHT PHOTOGRAPHER

Douglas B-26 tests a new device for providing illumination for highspeed aerial night photography. Developed by scientists at Wesleyan University, Conn., in cooperation with Air Research and Development Command, the mechanism burns finely ground magnesium powder to provide approximately 10 million candlepower for more than four minutes. A 12-ft. streamlined container attached to the plane's wing contains the powder. The light can be turned on and off. During the first test of the device in Connecticut, Air Force and police officials were besieged with phone calls reporting "flying saucers" or planes seen going down in flames.

Post Office to Outline Airfreight Mail Test

American Airlines startled the airline industry and pleased the Postmaster General last week by offering to haul transcontinental first-class mail at 25 cents a ton-mile.

Regular airmail rates of trunklines range from 45 to 53 cents a ton-mile.

Post Office executives heralded this bid as the first major airline move to hasten the Postmaster General's plan to move first-class mail by air over long-haul routes between major cities.

Developments last week:

• **Post Office** planned to tell the airlines within a few weeks exactly what routes and ton-mile volume it planned for a "pilot test" operation.

• **Air Transport Assn.** meeting of airline vice presidents broke up without deciding what rates to offer Post Office. ATA general counsel Stuart Tipton said they would have more to go on after Post Office Department specifies routes and volume.

• **American Airlines** offered to fly the mail at 25 cents a ton-mile on the New York-Los Angeles route for a test period of one year. American holds a high-capacity, low-cost advantage with new all-cargo Douglas DC-6As with which it started scheduled New York-Los Angeles cargo service last week.

• **Many airlines** became alarmed at the prospect that the proposed first-class airlift might undermine the established premium airmail service. They estimated that the Post Office may have only 100 million ton-miles of annual business suitable to first-class air shipment—long hauls between major cities.

National Airlines president G. T. Baker has written the Postmaster General that NAL would be glad to move mail at its established airfreight tariffs. But Baker pointed out that if he had flown last year's straight airmail at his freight rates instead of his 53-cent-a-ton-mile airmail rate, it would have cost Post Office $18,000 more. Reason for this is the high minimum charge on small shipments. Bulk consolidation by Post Office would eliminate part of this problem. Capital Airlines studies made similar findings.

On the hopeful side, however, some officials thought the Post Office might eventually ship heavy bulk of news journals and some other "time-preference" mail matter by air on major routes.

► **Legal Doubts**—Question of whether it is legal to ship surface mail by air is not yet settled. Post Office has yet to get a go-ahead from the Comptroller General.

Officials of both Post Office and ATA said a clearer picture of the mail airlift outlook will emerge in the near future.

CAA Aircraft Chief Visits Comet Plant

George W. Haldeman, chief of Civil Aeronautics Administration Aircraft Division, left for England last week to look into the Comet 3 jet liner situation. While abroad, he will confer with de Havilland Aircraft Co., Ltd. officials and the British Air Registry Board.

Chief concern of the CAA official will be the development and planning which has gone into the late-model Comet, looking toward cooperation with the British in certificating it for U. S. service.

Civil Aircraft, Engine Shipments

	1953		May 1952
	May	April	
Complete aircraft, number	**417**	**402**	**330**
By airframe weight			
3,000 lb. and over	23	17	42
under 3,000 lb.	394	385	288
By number of places			
over 5-place	23	17	42
1 to 5-place	394	385	288
By total rated horsepower, all engines			
400 hp. and over	23	17	42
under 399 hp.	394	385	288
Value of shipments of complete aircraft and parts, total (thousands of dollars)	**$24,445**	**$24,636**	**$27,130**
Aircraft, total	17,422	15,264	20,439
Aircraft parts	7,023	9,372	6,691
Value of shipments of aircraft engines and parts, total (thousands of dollars)	**$12,473**	**$13,044**	**$13,067**
Aircraft engines	6,537	5,471	3,587
Engine parts	5,936	7,573	9,480
Unfilled orders (number of planes 3,000 lb. airframe weight and over)	**394**	**396**	**602**

AVIATION CALENDAR

July 27-Aug. 2—1953 model airplane championship, U. S. Naval Air Station, Willow Grove, Pa.

Aug. 2—Amarillo, Tex., Jaycee Air Fair, observance of 50th anniversary of powered flight, Tradewind Airport.

Aug. 3-8—Fourth annual congress, International Astronautical Federation, Zurich.

Aug. 19-21—Western Electronic Show and Convention, San Francisco.

Aug. 19-24—Seventh International Model Plane Contest, sponsored by Plymouth Motor Corp., at Selfridge AFB and Belle Isle, Detroit.

Aug. 20-23—Air Force Assn. annual convention, Statler Hotel, Washington, D. C.

Aug. 25—Ninth legal committee session, International Civil Aviation Organization, Rio de Janeiro. Meeting will study and revise a draft intended to replace or amend the Warsaw Convention international air law.

Sept. 5-7—National Aircraft Show and 50th anniversary of powered flight, Dayton (Ohio) Municipal Airport.

Sept. 7-13—1953 SBAC Coronation Year Flying Display, Farnborough, England.

Sept. 7-17—Fourth International Aeronautical Conference, joint meeting of RAeS and IAS, London.

Sept. 9-11—Air safety seminar of Flight Safety Foundation. Probable location: Luxembourg.

Sept. 12-13—Third Wisconsin air pageant, Curtiss-Wright Airport, Milwaukee.

Sept. 21-25—Eighth National Instrument Exhibit, Instrument Society of America, Sherman Hotel, Chicago.

Sept. 23-24—1953 meeting of Aircraft Spark Plug and Ignition Conference, Champion Spark Plug Co., Toledo.

Sept. 28-30—Ninth annual meeting, National Electronics Conference, Hotel Sherman, Chicago.

Sept. 29-Oct. 3—National Aeronautics Meeting, Aircraft Engineering Display and Aircraft Production Forum of the Society of Automotive Engineers, Hotel Statler, Los Angeles.

Sept. 30-Oct. 1—Aircraft electric equipment conference, American Institute of Electrical Engineers, Seattle.

Oct. 10—England-Christchurch (New Zealand) air race, with speed and transport handicap sections.

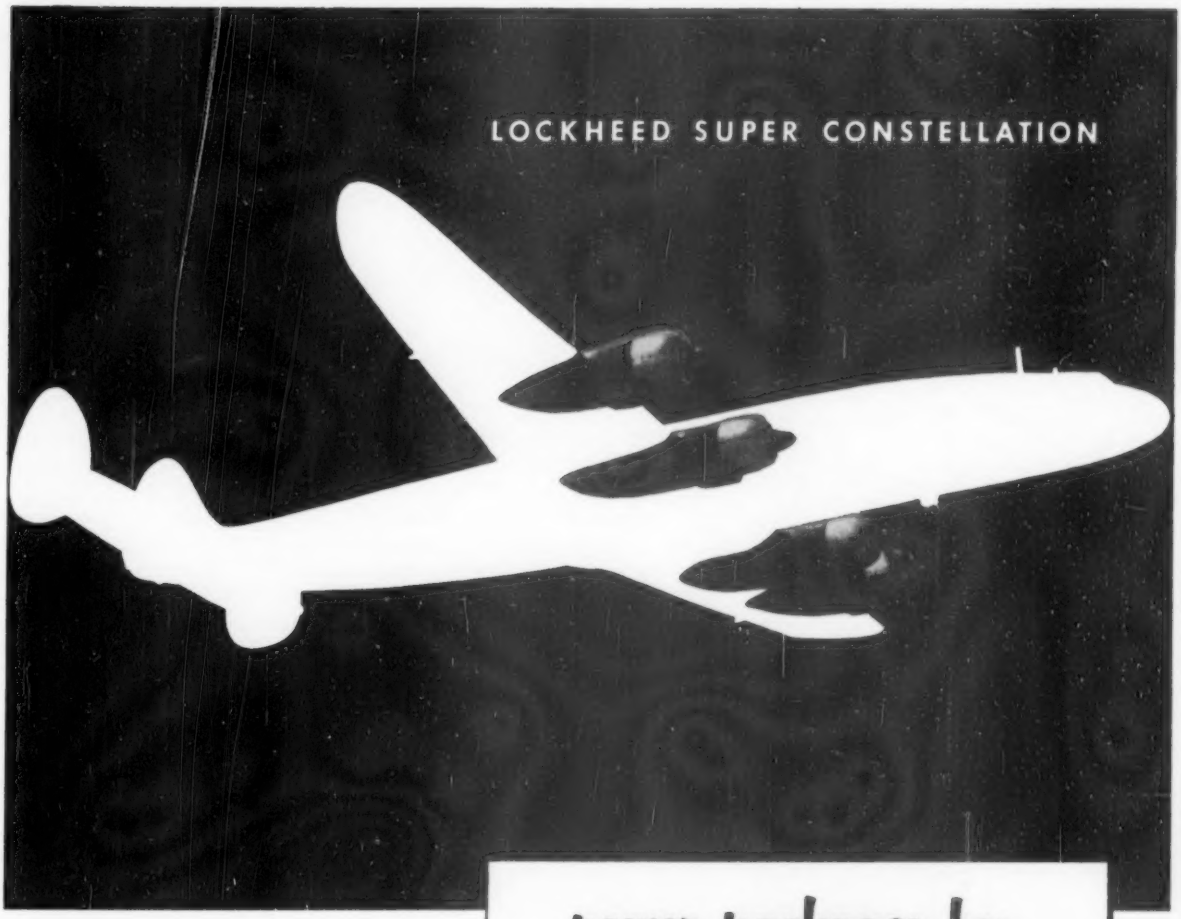
Oct. 14-15—Annual airport development and operation conference, sponsored by New York Department of Commerce, Onondaga Hotel, Syracuse, N. Y.

Oct. 28-30—Annual convention of Southeastern Airport Managers' Assn., Marlin Beach Hotel, Ft. Lauderdale, Fla.

Nov. 3-4—1953 Transport Aircraft Hydraulics Conference, sponsored by Vickers, Inc., Hotel Park Shelton, Detroit.

Nov. 16-17—Aircraft Quality Control Conference of the Aircraft Technical Committee, American Society for Quality Control, the Biltmore Hotel, Dayton, Ohio.

Nov. 17-18—First regular meeting of the Operations Research Society of America, National Bureau of Standards, Washington, D. C.



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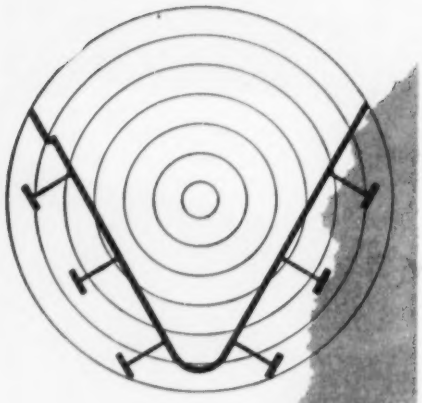

The 13,200-ton squeeze of this press means that Alcoa extrusions can be larger, thinner, and more intricate than before. Ribbed extrusions for panels, for example, can be made, as illustrated, 34 inches wide—saving greatly in riveting and assembly.

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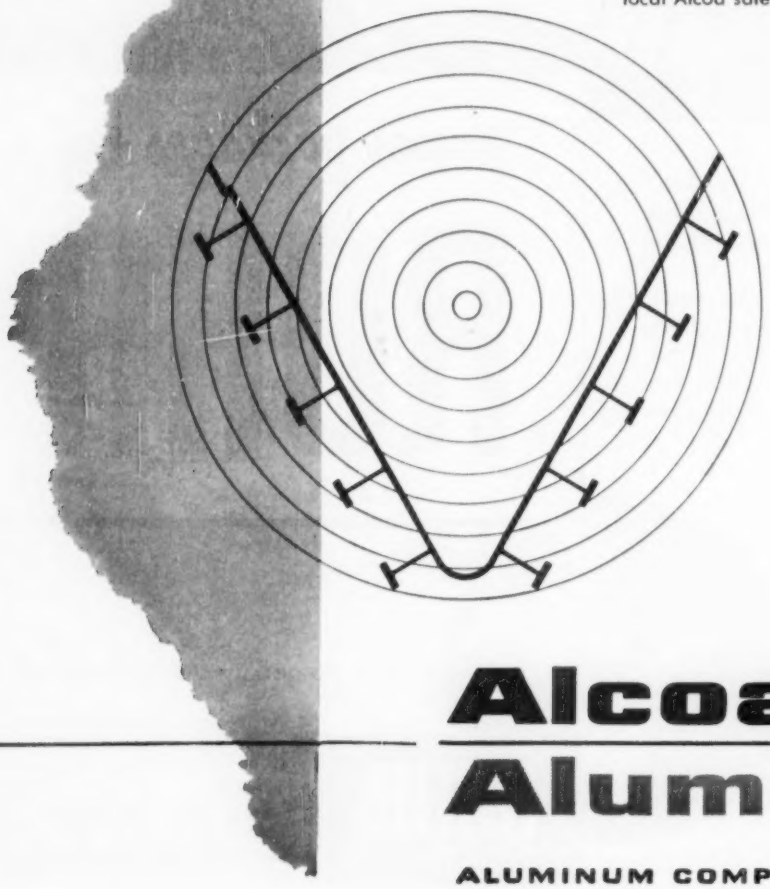

Alcoa Aluminum

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GIVE AND TAKE in Korean aerial warfare is illustrated in photos showing badly battered F-86F which made it back to base after Red anti-aircraft had scored hits on tail (left) and wing leading edge (right) while pilot was pursuing a MiG-15. Most of rudder was shot away by the enemy's ground guns and the right wing's front spar was nearly severed.

AF's MiG Kills Pass 800 Mark

Record destruction of 74 Russian-built MiG-15 jet fighters in aerial combat during June—highest monthly score since the start of the Korean war—marks Far East Air Forces' second quarterly report for 1953. Further pointing up the superiority of Air Force pilots and their Sabres is the fact that not a single F-86 was shot down during June's big air battles.

During the three-months period the Sabres knocked down a total of 156 MiGs, probably destroyed 24 and damaged an additional 96 with a loss of only three F-86s in combat. The swept-wing USAF jets are credited with killing 765 MiGs up to June 30, compared with 56 Sabres lost. Total MiGs knocked out by FEAF planes since the start of hostilities number 803.

▶ **UN Air Losses**—In addition to heavy MiG losses during the second quarter of this year, two unidentified enemy jets were also destroyed by the Air Force, a PO-2 piston-powered biplane was probably destroyed by a Marine Corps Skyraider and two prop-driven Yak-18s were knocked down by a Marine Corsair. Total United Nations plane losses during the period were 67 as follows:

- **Air-to-air combat:** 3 F-86s.
- **Enemy groundfire:** 13 F-86s, 1 F-80, 9 F-84s, 1 F-94, 3 T-6s, 1 B-26, 2 F-51s, 3 Gloster Meteor Mk. 8s and two AU-1s.
- **Losses from other causes:** 15 F-86s, 6

Air Combat Operations in Korea

(to June 30, 1953)

Enemy losses	Destroyed	Probably Destroyed	Damaged
MiG-15	803	145	917
All types (incl. MiGs)	976	173	1,007

U.N. losses	Air-to-air	Ground fire	Other causes
USAF jets	81	247	91
USAF pistons	21	284	57
Shore-based Marine planes	0	77	34
Friendly foreign planes	6	54	22

Missions	By USAF	By attached units
Sorties flown	696,600	116,787
Vehicles destroyed	73,165	7,298
Rail cars destroyed	9,192	1,056
Bridges destroyed	793	261
Tanks destroyed	1,147	144

SKIN PANEL ALLOWABLES INCREASED WITH 75 ST

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75ST HI-SHEAR rivets combat "head popping" and wrinkles in skin panels more effectively than 24ST DD rivets. Combining higher material strength and close tolerance heads, the 75ST HI-SHEARS permit higher shear and tension allowables, reduce shop problems and improve surface flushness.

HS25 rivets with the AN426 styled head permits countersinking in skin minimum thickness of .072 or more. Hole preparation is accomplished with same standard tools.

HS23 with the small HI-SHEAR styled head permits countersinking in thin gauges (.051 min.) and eliminates sub-countersinking or sub-dimpling in frame-to-skin attachments, extrusions, stainless steel, titanium or where dimpling clearances are lacking.

HS26 with a flat head attaches thin sheets where bearing is critical. Reduced by 3/5rds the weight of a steel fastener.

- 75 ST HI-SHEARS drive with ⅓ the force of DD rivets and eliminate "ice-boxing" DD rivets.
- 75ST HI-SHEARS use the same standard Sets as used in driving steel HI-SHEARS.
- 75ST rivet pin uses an A17ST HS24 collar (dyed blue).

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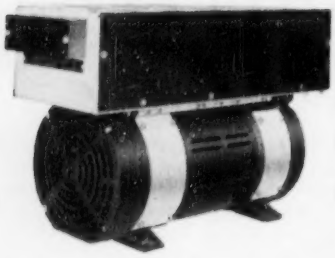

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INVERTERS — 400 CYCLE OUTPUT

Type Number	INPUT		OUTPUT			Approx. Weight Lbs.	Max. Alt. Feet	Designed to Govt. Part No.
	Volts	Amps	Volts	Phase	VA Rating			
12128	27.5	1	26	1	6	5	35000	AN3496-1 AF
MG-54	27.5	22	115/200	1	250	18	65000	E-51A1A-9 Navy
				3	250			
12142	27.5	22	115	1	250	13	35000	N17158 Navy
				3	250			
12146	27.5	22	115	1	250	13	35000	53B6239 AF
MG-60	27.5	22	115	1	250	17	65000	53B6239 AF
MG-62	27.5	22	115	3	250	17	65000	AN3532-2
32E01	27.5	35	115	1	500	26	50000	AN3533-1
				3	500			
32E00	27.5	45-54	115	1	500	34	50000	AN3534-1
				3	750			
MG-44	27.5	55	115/200	1	750	35	50000	E-52804-2 Navy
				3	750			
MG-57	27.5	100	115/200	1	1250	42	50000	E1737-1 Navy
				3	1500			
MG-61	27.5	100	115	1	1500	51	65000	—
MG-64	27.5	100	115	3	1500	51	65000	—
1518 Mod. 1 & 2	27.5	130	115	1	1500	37.5	20000	—
				3	1800			
1518 Mod. 5	27.5	130	115	1	1500	37.5	35000	—
				3	1800			
32E06	27.5	180	115/200	1	2250	56	50000	E1725-1 Navy
				3	2500			
32E03	27.5	180	115	1	2500	56	50000	AN3516-1
32E09	27.5	180	115	1	2500	56	50000	—
				3	3000			

NOTE: D.C. Input voltage shown is a nominal value of 27.5 volts, but all units are designed to operate from 26 to 29 volts. Input Amperes shown are values at 27.5 volt input.

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F-84s, 1 F-80, 2 F-94s, 2 B-26s, 1 H-19, 1 Meteor Mk. 8 and 1 AU-1.

► **FEAF Sorties**—Sorties for the three months by FEAF planes totaled 86,717 an increase of 20,000 over the previous quarter. Night-flying B-29 mediums carried out 1,343 bombing sorties and unloaded 26,860,000 lb. of explosives, leveling more than 5,100 buildings, damaging more than 325, hitting troop and supply positions and knocking out many enemy airfields. Fighter bombers and supporting units struck at more than 15 airfields, breached the Toksan and Chasan Dams, marshalling yards and other transportation facilities. Night-flying Douglas B-26s destroyed 5,020 Red supply trucks.

During the Apr. 1-June 30 period, 310,000 passengers were carried on the Korean airlift—the figure exceeding 100,000 each month. Some 19,000 evacuees were flown out and 48,000 tons of cargo were carried. During this period FEAF's combat cargo planes carried 800,000th fighting man to Japan for rest leave and the 187th Regimental Combat Team and its equipment were carried to Korea.

Air Rescue logged more than 1,500 sorties and saved 935 United Nations personnel including more than 30 behind-the-line pickups of downed airmen.

Lufthansa Expects To Fly Comet 3s

West Germany's airline, Lufthansa, will be flying de Havilland Comet 3 jet liners in overseas service by 1960, Werner Krepe, director of the Aviation

1,000TH COPTER

Top United Aircraft Corp. officials view the 1,000th helicopter to be produced by UAC's Sikorsky Aircraft Division, Bridgeport, Conn. Standing by the nose of the USAF H-19B, left to right: C. J. McCarthy, UAC vice president; Igor Sikorsky, engineering manager and B. L. Whelan, general manager of the Sikorsky Division. The firm has produced a total of nearly 4 million copter airframe pounds.

Division of West Germany's Transport Ministry, predicts.

The airline, now in advanced stages of organization, has ordered an undisclosed number of Lockheed Super Constellations slated for delivery in spring of 1955.

Krepe's prediction indicates that the reorganized airline will use both the Turbo Compound Super Connie and the Comet 3 internationally.

Domestically, it is expected the airline will use the Convair 340. AVIATION WEEK (May 11, p. 100) reported earlier the German airline would order 20 to 24 aircraft, presumably half for domestic and half for use on its international routes.

Official organization of the airline awaits ratification of the Allied peace treaty by the German Bundestag.

British Jets Test U. S. Angled Deck

The British Navy's latest and fastest jet fighter, the Hawker Sea Hawk, recently completed a series of successful landing and takeoff trials from the angled deck of the 37,000-ton U.S. Navy carrier Antietam while the ship was visiting Portsmouth, England. The Royal Navy's Supermarine Attacker jet fighter also participated in the tests.

In one day, the British and U.S. Navy pilots who demonstrated the carrier's new deck design, made 62 landings and 26 takeoffs despite poor visibility.

Reaction of the British pilots was summed up by the senior pilot of Sea Hawk Squadron 806, Lt. Cmdr. R. A. Shilcock: "Flying onto this angled deck area is a much easier and happier affair. You have control of the aircraft right up to the moment the arrestor hook engages the wires.

The angled deck design entails adding a "pie-shaped" portion to the side of the carrier's normal deck so that pilots come in for a landing several degrees off the centerline. On a conventional deck, if the hook fails to catch the arresting wires, the plane generally smashes into a crash barrier, often with severe damage.

The new deck permits pilots to gun the plane clear of the ship's structure should any difficulty arise. Since January of this year when tests were started with the Antietam, the 115 planes that failed to hook the deck wires probably would have rammed the crash barrier on a conventional carrier.

Recommendations have been made to add another two degrees to the Antietam's present eight-degree cant. Three more U.S. carriers are being adapted to take the new deck design and the British are using it on their new ship, the Hermes.

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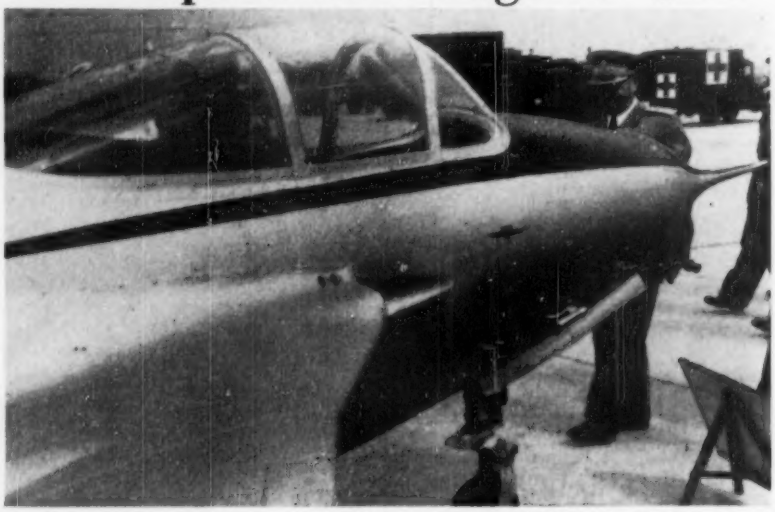
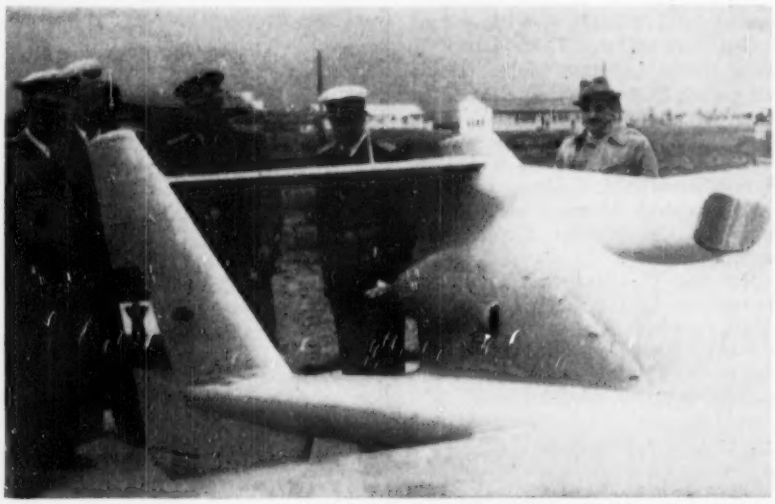
Tito Inspects New Yugoslav Jets



MIDWING jet-powered single-seater being viewed by Marshal Tito has tricycle landing gear. It is powered by two French-built turbojets supplying approximately 330-lb. thrust each. Other view of plane, below, shows . . .



TWIN BOOMS carrying dual fins and rudders. Horizontal tail is mounted high to avoid blast from twin tailpipes mounted one above the other. Photos were taken at a military field near Belgrade during an "open house."

TAXIING Yugoslav single-seater also is fitted with two 330-lb. thrust French jets, in this case one under each wing. Top speed is estimated at 350 mph. What appears to be a heavy-caliber gun is mounted underneath the nose.

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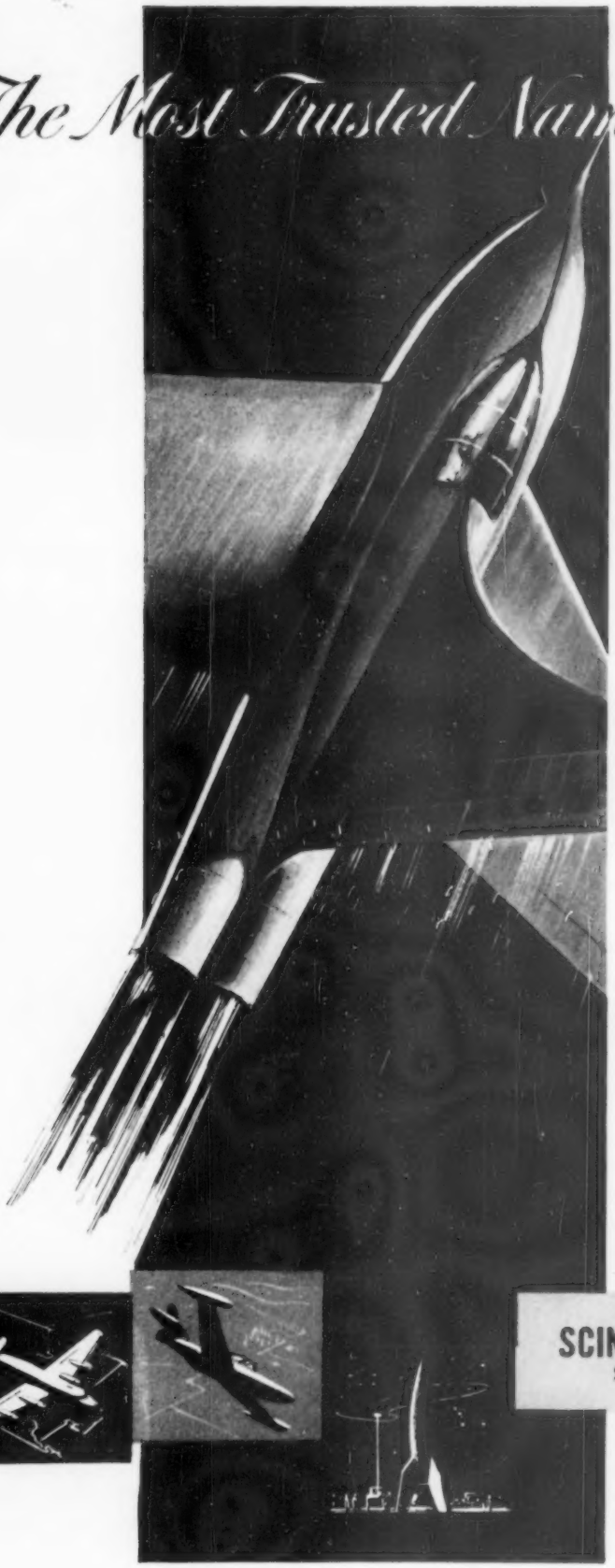

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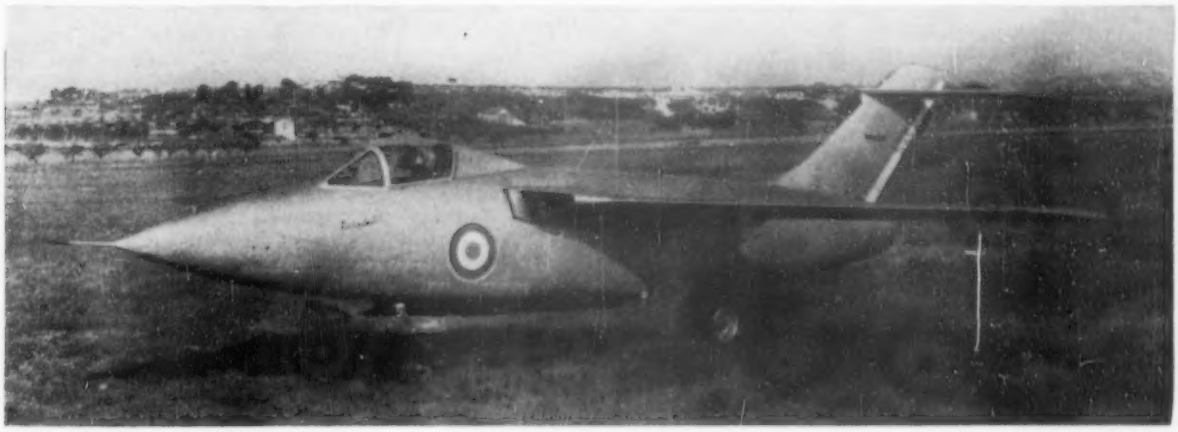


French Fighter Takes Off From Dolly

The Gallic Touch

The latest aircraft to come from the drawing boards of the French nationalized aircraft factory Sncase typifies the originality and ingenuity of a Gallic touch. Le Baroudeur, a new ground attack fighter, is a reasonably conventional airplane used in a reasonably unconventional manner. Its takeoff is from a trolley; its landing, on skids. In France, where land is expensive and long runways in the minority, this concept makes sense because it means that the aircraft can operate in rough, unprepared fields.

The design thinking behind this unusual airplane and details of its construction are presented in this exclusive Aviation Week *report prepared by British engineering writer, James Hay Stevens.*

Le Baroudeur—French Foreign Legion slang for an aggressive and resourceful fighter—is a new concept of ground attack aircraft and represents the kind of advanced thinking which has characterized French postwar aviation.

This new attack plane, developed as a private venture by the Societe Nationale de Constructions Aeronautique du Sud-est, was built around the general idea of designing an airplane with contemporary performance, but without the contemporary runway requirements. The plane takes off from a disposable "trolley" or dolly; for landing, retractable skids are extended on the fuselage. Its ultimate performance is expected to be near sonic speed.

▶ **Basic Description**—Apart from the unusual takeoff and landing gear, le Baroudeur is a relatively conventional airplane both structurally and aerodynamically. The design aim was first to get good visibility, particularly forward and downward from the cockpit, and secondly, a steady firing platform at the high speed expected of the airplane.

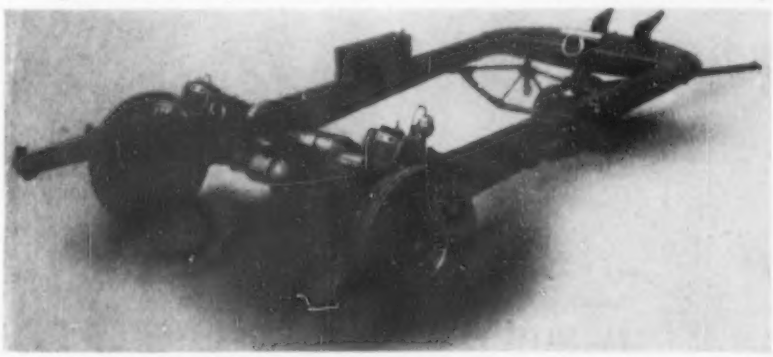
Easy maintenance and simple construction were considered of equal importance in design.

The fuselage is needle-nose, with the pilot compartment far forward. Geometry is swept, and the angle of sweepback is 35 deg. Powerplant is the Atar 101 axial-flow turbojet; armament consists of 30-mm. cannon.

But the really novel feature of le Baroudeur is the takeoff procedure. A jeep tows the trolley to a position in front of the airplane; then the airplane is pulled up onto the trolley by a winch. Positioning of the plane is automatic by means of a center roller at the rear of the trolley. Plane slides into place and is supported by a cradle under its nose and by two pads, one at each side. Loading on the trolley takes less than one minute.

Before takeoff, the pilot adjusts a special airspeed indicator for the correct takeoff speed for his gross weight. This special indicator operates warning lights to tell the pilot when he has reached takeoff speed. The trolley is then armed with four or six Rato (rocket assist takeoff) units depending on the gross weight and available system. Two of these rockets are actually reserved for emergency use.

The pilot starts the engine and when he is ready to take off opens the throttle and fires the rocket. On starting,



LE BAROUDEUR'S DOLLY is equipped with pneumatic brake bottles, rubber shock absorbers and brackets for from four to six Rato (rocket assist takeoff) units.

the trolley accelerates very rapidly and is steered by differential braking. As speed increases during the takeoff run, the airplane pivots on its rear mounting and the front mount rises on supporting arms until the takeoff attitude is reached.

When warning lights indicate the takeoff speed has been reached, the pilot releases the trolley, increases the angle of attack and the airplane flies clear.

▶ **Design Origin**—The idea of le Baroudeur was originated by Georges Hereil, president of Sncase. Throughout the design and building of the prototype, Hereil took the closest personal interest in his "brainchild." He places great hopes for Sncase's future in le Baroudeur.

The firm had previously built another ground attack airplane, the Grognard, to an Air Ministry specification. That airplane—which was powered by twin jet engines mounted vertically like the barrel on an over-and-under shotgun—was formed exactly to the specification, but was dropped.

The same thing had happened to the Armagnac, a four-engine airliner which had been put into production without prototype construction. It also conformed exactly to specifications, and it also was dropped by the government.

Having had this somewhat bitter experience of designing to specifications, Sncase decided to try its hand at a fresh concept, a private venture which would be completely free from any official restriction.

The chief engineer on the new project was W. J. Jakimiuk, who was a senior engineer in the Polish firm of PZL before the war. Jakimiuk was responsible for the development of the de Havilland Chipmunk and Beaver in Canada, and later in England had similar responsibility for the de Havilland Sea Venom, now being built under license by Sncase.

▶ **Catapult First**—Originally le Baroudeur—which bears the company model designation S.E. 5000—was intended for a catapult takeoff and skid landing. Sncase soon realized that development of the catapult would take much longer than that of the airplane, so it was decided to use a trolley instead. Jakimiuk had had successful experience with the de Havilland Beaver, using a takeoff trolley.

Low-pressure tires were specified so that ordinary grass fields could be used for takeoff. A year's time went into the evolution of a trolley that was stable directionally, both with and without the aircraft, could be controlled directionally by the pilot and could be stopped quickly after takeoff. A full-scale trolley was built and tested under empty conditions and carrying a mock-up of the aircraft.

The trolley is a welded steel tubular carriage with two relatively large main wheels and castering twin nose wheels. The shock absorbers are rubber blocks; soft blocks for taxiing and traveling lights are compressed to stops that allow hard blocks to take the running weight and the fully laden trolley.

Brakes on the main trolley wheels are operated differentially by the pilot's rudder pedals through a connecting line. Six solid-gear rockets are used for takeoff; two or four may be used depending on the gross weight, and two are kept in reserve.

When the airplane weight leaves the trolley, trolley brakes are automatically applied and a series of tines are lowered and dig into the ground. These are spring-loaded so that if one does hit a rock, the tine will turn over without breaking. A careful test program evolved a trolley that will run straight over rough ground within a width of 50 or 60 yd. Braking from 120 mph. to a halt in 80 yd. and a ground run at 175 mph. have been achieved.

One major problem of trolley-operated aircraft in the past (the German Messerschmitt 163B and Arado 234-A for example) is the actual aircraft mounting on the trolley. In the case of le Baroudeur there is a small keel under the plane and a spiral auto-center-

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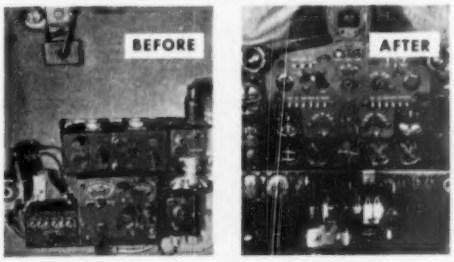

ORDINARY INSTALLATION VERSUS RAS INSTALLATION... On the left is an ordinary installation of a $29,000 "nerve and control center." On right, same equipment "custom engineered" by RAS specialists. RAS complete facilities include main hangar handling twenty-five planes "in work" at one time, complete radio and electronics service center, most modern equipment for engine and accessories overhaul.

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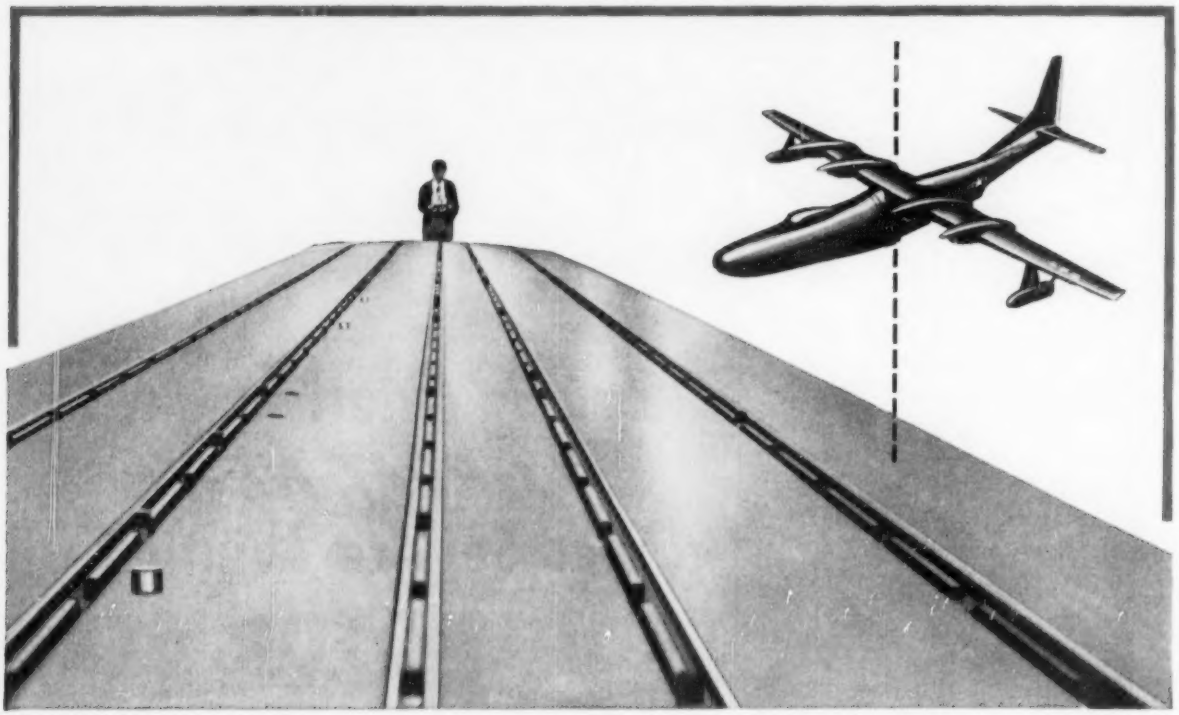

MAGNESIUM EXTRUDED CARGO DECK SECTION *of the new Convair-built Navy R3Y-1 "Tradewind" now in production at San Diego. Magnesium provides the R3Y-1 with a tough, yet lightweight, easily installed cargo deck for heavy-duty service*

In all its 40-year history, water-based aircraft has never been appraised in terms of speed or maneuverability. The big lumbering transports of past years were reputedly slow and cumbersome in flight. This was true primarily because of their great weight.

Today, however, Convair and the U. S. Navy present the "Tradewind" as the fastest flying boat in aviation history. Its turbo-prop engines provide a top speed of more than 350 mph . . . enable it to take off in 30 seconds with full load.

One factor that contributes greatly to the increased speed and easy handling of this giant seaplane is the extensive use of magnesium in its design. Take as an example, the cargo deck. It's made of magnesium ZK60A extrusion alloy. It's light in weight. (Magnesium is the world's lightest structural metal!) And it's strong and rugged enough for heaviest duty. This combination of qualities makes magnesium perfectly suited for this application.

There are other instances, too, in this and in other aircraft, where magnesium has helped designers solve some of their weight and speed problems. Have you considered magnesium for your uses? For more detailed information, contact your nearest Dow sales office, or write directly to THE DOW CHEMICAL COMPANY, Magnesium Department, Midland, Michigan.

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ing roller on the rear of the trolley. There is a certain weight penalty paid for this case of mounting in the form of a long keel at supporting structure; but some of this can be charged to the extra strength advantage of the keel in valley landings.

One of the arguments which has been advanced in the past in favor of skid landing gear has been the saving in weight. This has proved to be largely fallacious when put into practice. The skids on the S.E. 5000 are lighter than conventional landing gear, but the keel structure and the supporting mechanism results in a total weight only a little lower than normal.

The reason for using skids for landing was to obtain an airplane which would be completely independent of the runway and which would be able to decelerate rapidly so that its landing run would be comparable to its rocket-assisted takeoff.

▶ **Skid Details**—There are three skids on le Baroudeur, two main and a small rear one. These are built from magnesium castings with a plastic heat-insulating strip and a replaceable steel shoe. These shoes taper from $\frac{5}{8}$ in. thick at the front to about $\frac{3}{4}$ in. thick at the rear, and are attached by screws in the sides so that the shoes can be easily removed for replacement.

Test results so far have shown that shoe life on grass or metal-mesh runways is greater than that of a tire; even the desert-like stony soil of Istres near Marseilles does not produce excessive wear.

Suspension of the skid is done with rubber blocks which are torsionally loaded for shock absorption and in direct compression with fore and aft movement. This landing gear was mounted on a metal mockup of the airplane and drop tested. Later, tests were made by speeding over a ramp and finally by shooting the gear off the actual launching side.

The tests evolved the satisfactory shock-absorbing characteristics in the present gear, and overcame many minor difficulties that would have held up prototype flight tests.

▶ **Full Fuselage**—The fuselage contains everything—pilot, engine, fuel, landing gear and armament. Its structures are simple and consist of a tensile steel, built-up main frame and skin panel. Panels are made of sub-assemblies complete with partial frames and longitudinal stiffeners.

The rear portion of the fuselage is removable through a four-point attachment, and there are the customary quick releases for controls and plumbing for the engine. The Atar turbojet is mounted well aft and is fed by wing root intakes that are built ahead of the wing itself. With the wing high, there appears to be ample space underneath

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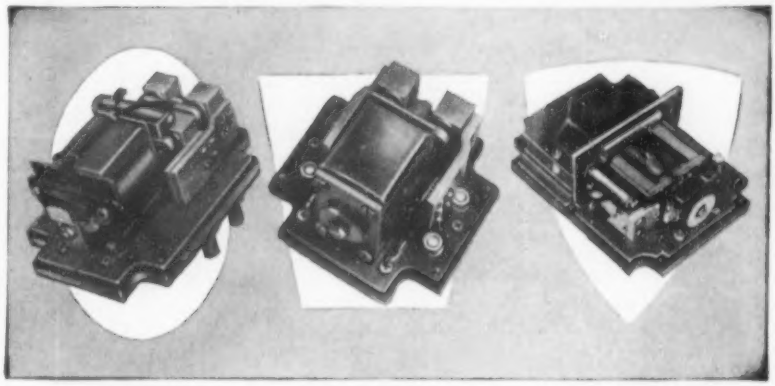

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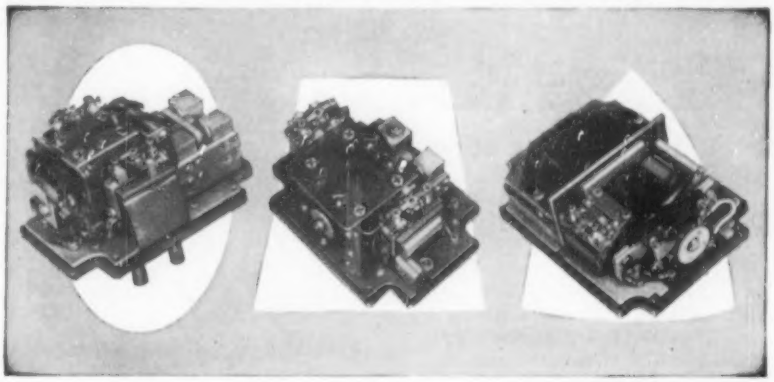

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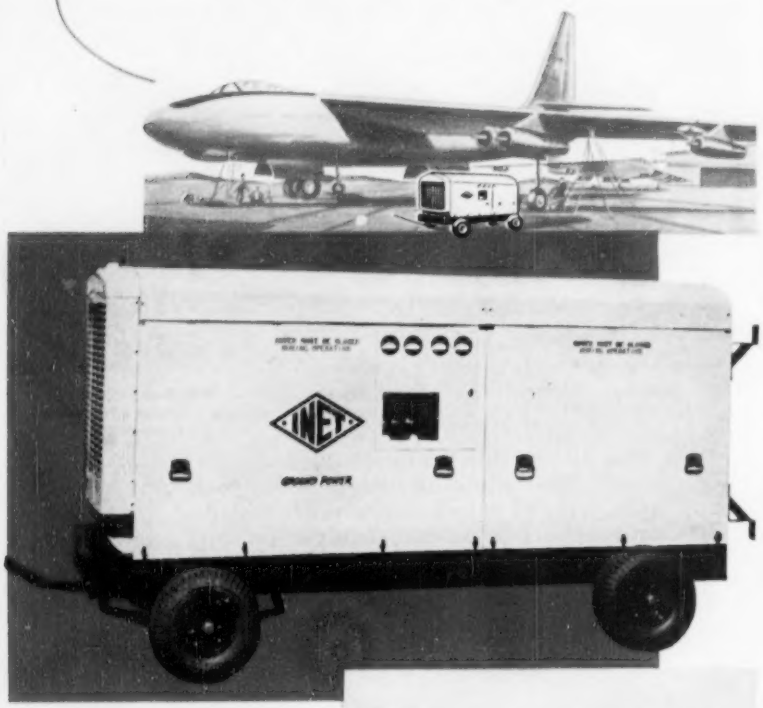

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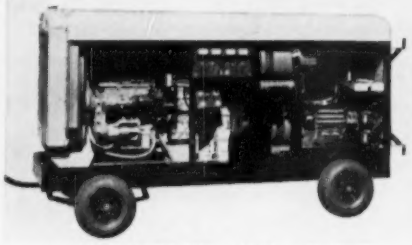

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for the fuel tank, conveniently near the airplane center of gravity.

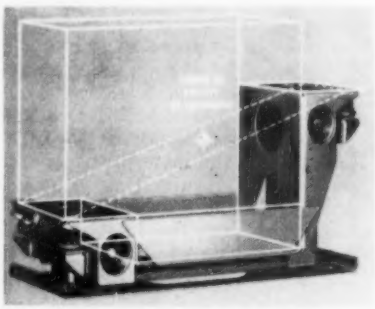
The pilot sees well ahead of the wing with only a narrow nose ahead of him to give a downward view of 17 deg. from the horizontal. The hood slides aft in one piece; its opaque rear portion is a plastic which permits mounting the radio compass behind the pilot's head. The hood frame is a single magnesium casting.

Although designed primarily for ground attack, le Baroudeur has a pressurized and air-conditioned cockpit to cater to a possible interceptor role. The fixed armored glass of the windshield has been mounted inside a thinner outer layer with a hot-air space in between to overcome frosting without having to heat the glass itself.

The ejector seat control is arranged to jettison mechanically. The cable from the face shield is wound round a drum; during the first half turn, cartridges are fired to break the hood fitting and allow the transparent part to pivot up and back. In the remaining 2½ turns, the seat cartridges are fired.

The standard French armament of 30-mm. cannon is mounted in the bottom of the fuselage under the cockpit. Cannon location—far below the thrust line—might be expected to cause considerable nosedown kicking moments when the weapons are fired. The cannon weigh about 330 lb. each and the shells and links about 3½ lb. apiece.

► **Thin Wings**—The laminar-flow is very thin and fully swept, although the angle is less than that of the tail surfaces. One would guess that the critical Mach number is approximately 1.0. The aspect ratio is moderate, and the chord is increased to compensate



CG SHOCK MOUNT

New center of gravity-type shock mount to take into account configuration, weight and inertia characteristics of particular assemblies, has been developed by Robinson Aviation, Inc., Teterboro, N. J. Met-L-Flex resilient cushions are located at top and bottom of mount and the diagonal plane between them passes through the G of the component mounted. Robinson says the unit was developed for the Minneapolis-Honeywell Regulator Co.

for the thickened section at the air intake.

The wing structure breaks from the current trend of a hollow box, although the design is not unique. Each panel —a half wing— is bolted directly to fittings on three reinforced fuselage frames. A single bar with a solid web and extruded boom at about 40% of the wing chord carries all bending loads, and transmits them to the fuselage through two steel fittings at the root. Front and rear spars are lighter, and carry the slat, flap and aileron loads in addition to carrying the torsion load of the fin to the fuselage through one bolt in each spar.

There are two interesting features about the wing attachment:

• **Torsion fittings** have been designed to carry the bending load in normal flight.

• **Attachment bolts** of the main spar top flange are horizontal, so that they can be used as a hinge when replacing a wing in the field, with minimum ground equipment.

The remainder of the wing framework is made from the standard flanged ribs which are fairly closely spaced. The skin is of moderate thickness with numerous band wire stiffeners on the upper surface and only four on the lower, which is pierced to take several large section doors.

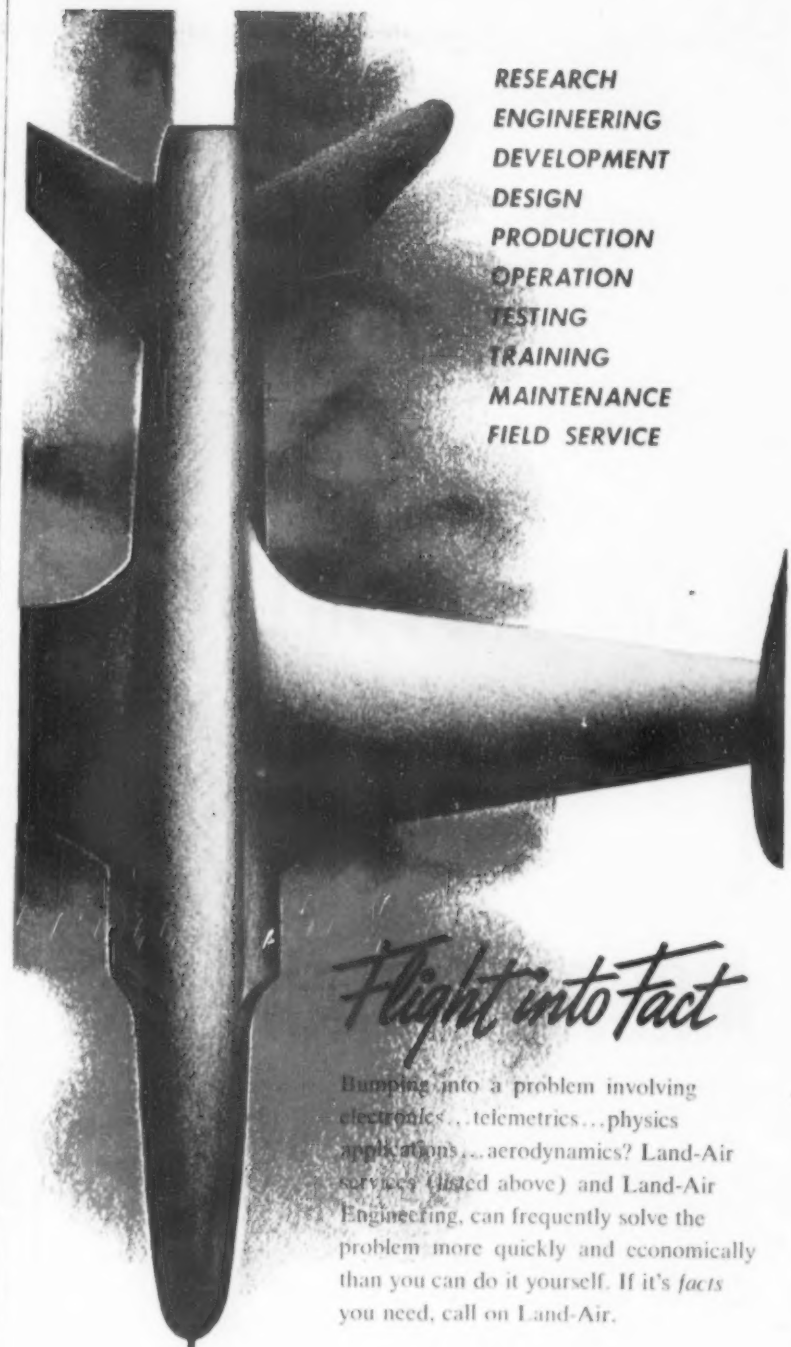
Fully automatic flaps are fitted in four sections at each wing. The ailerons are sealed and pressure-balanced; they are hydraulically boosted.

The flaps are of the slotted extension type with the indoor hinges so arranged that the flaps act as split types under the root fillet. The fillets themselves are arranged to pivot around their mid-chord line to act as airbrakes. Since the wing trailing edge is almost on the line of thrust, and the brake extends equally above and below the wing, there should be no change in pitching moment and the brakes should be balanced aerodynamically.

► **Tail Units**—The fin is of two-spar construction with stamped ribs and the fin has lengthened stiffeners. The fin tip is plastic and houses antennas.

The horizontal tail is similar in construction and is built in one piece. Use of a continuous web for the rear spar and continuous extruded fin stiffeners is unusual in this surface. The tail is hinged at its rear spar from two brackets jutting out from the fin rear spar.

The chord of the elevator is small and may eventually be used mainly for trimming, with the adjustable portion for primary flying control. The elevator and rudder are sealed and pressure-balanced and mass-balanced. The elevator is operated by a hydraulic boosting system with a fail-safe system. If hydraulic pressure drops, the operating struts lock solidly so they can be used



Flight into fact

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as mechanical linkages to operate the control.

To keep the center of gravity of the tail ahead of its flutter axis, the elevator motors are mounted in the leading edge of the tail plane.

Electric motors are used for trim of the elevator and this system also serves as a standby since there is a double-feed action for control operation.

▶ **Axial-Flow Engine**—Powerplant of le Baroudeur is the Sncase Atar 101, an axial-flow turbojet designed by H. Oestrich, formerly of the Bayerische Motoren Werke in Germany. This engine has been a very long time getting into production. The version at present available gives about 6,000 lb sea-level static thrust; in the S.E. 5000, an afterburner will be used to boost thrust.

The engine is trunnion-mounted just ahead of the fuselage break.

The wing root intake is a clear run of ducting into a central trunk which feeds the compressor. The intake has a sharp lift and a single guide vane in the duct. The fuselage boundary layer is diverted by air bleeds into the fuselage where it eventually provides cooling air for the jet exhaust.

▶ **Split Effort**—Work on the two prototype aircraft cannot have been easy because it was divided between the plant near Paris at La Courneuve and the plant at Marignane near Marseilles, 500 miles away.

But the development has been done in reasonable time and in the most practical manner. The cost of all the preparatory work and of the two prototypes has been borne entirely by the company. This indicates a careful and economical design which has been on the basis of quantity production throughout. The jigs and fixtures used are of a production, and not experimental, type.

An idea of the precision of the design work can be gained from the fact that the prototype weighed only 35 lb. over the estimated structure weight.

—James Hay Stevens

for AIRCRAFT ALLOYS

Specification	Shape	Analysis	Condition, etc.
MIL-S-5000A	Bars	4340	Rounds, Squares, Hex's, Flats, Billets, Annealed
MIL-S-5626	Bars	4140	Rounds, Hex's, Flats, Billets, Annealed, Normalized
MIL-S-6758	Bars	4130	Rounds, Squares, Hex's, Flats, Billets, Annealed, Normalized Normalized & Tempered, Heat Treated
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AN-QQ-S-685	Strip	4130	Annealed & Normalized
AN-S-11	Strip	1020-25	

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	Plates	Type 321	Hot Rolled, Annealed & Pickled
MIL-S-7720	Bars	Type 303	Rounds, Squares, Hex's
AMS 5510	Sheets	Type 321	2D Finish
AMS 5521	Sheets	Type 310	2D Finish
AMS 5610	Bars	Type 416	Rounds, Squares, Hex's
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Boeing Leases AF Base for B-52 Tests

Rapid expansion of B-52 production has forced Boeing Airplane Co. to lease a portion of Fairchild Air Force Base, 230 mi. east of its Seattle plant, for experimental and production flight testing of the eight-jet bomber.

Boeing officials say Stratofortress production is now "well along." Facilities at Boeing Field, Seattle, are inadequate for full-scale flight testing of B-52s once they begin coming off the line.

Use of the Spokane Air Force base, present home of a B-36 wing of the Strategic Air Command (92nd Bomb Wing), is expected in about a year when approximately 1,700 employes will begin working for Boeing at the base.

Officials say the base was chosen because of its proximity to a city capable of providing sufficient housing for employes.

As soon as B-52s begin coming off the production line at Seattle, they will be flown to Spokane for testing prior to delivery to SAC units.

Only the XB-52 and YB-52 are flying now. Production models of the Stratofortress will have a slight design change in the cockpit. Instead of pilots sitting tandem, as in prototypes, pilot and co-pilot will be seated side-by-side.

Guggenheim Grants Ten Jet Fellowships

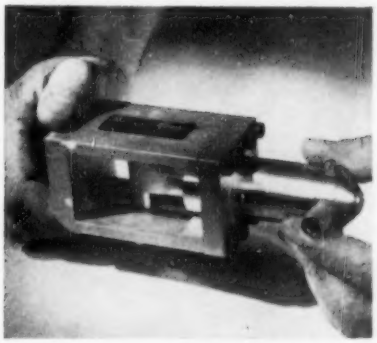
The Daniel and Florence Guggenheim Foundation has awarded fellowships for advanced study at the Guggenheim Jet Propulsion Center, Princeton University, to seven students, two engineers and an Air Force lieutenant.

Recipients of the annual grants were selected for "technical ability, leadership qualities and interest in the rocket

and jet propulsion field," the foundation says.

First-time fellows: Frank Baltakis, University of Pittsburgh; Arthur A. Kovitz, rocket research engineer at Bell Aircraft Corp., Buffalo, N. Y.; Andrew F. Burke, Carnegie Institute of Technology; K. Evan Gray, Princeton; USAF 1st Lt. Ernest E. Ebrite; Sinclaire M. Scala, design engineer at Westinghouse Electric Corp.'s Aviation Gas Turbine Div., Philadelphia; and Victory Kebely, University of California.

Guggenheim fellows whose grants were renewed for another year: Arnold Brooks, Henry E. Hoecher and Marcel Vinokur.



Remote Guillotine Chops Missile Cables

Guillotine Destructor that can be actuated remotely to sever cables, wires and fluid lines in guided missiles at a given signal are being produced by Beckman & Whitley.

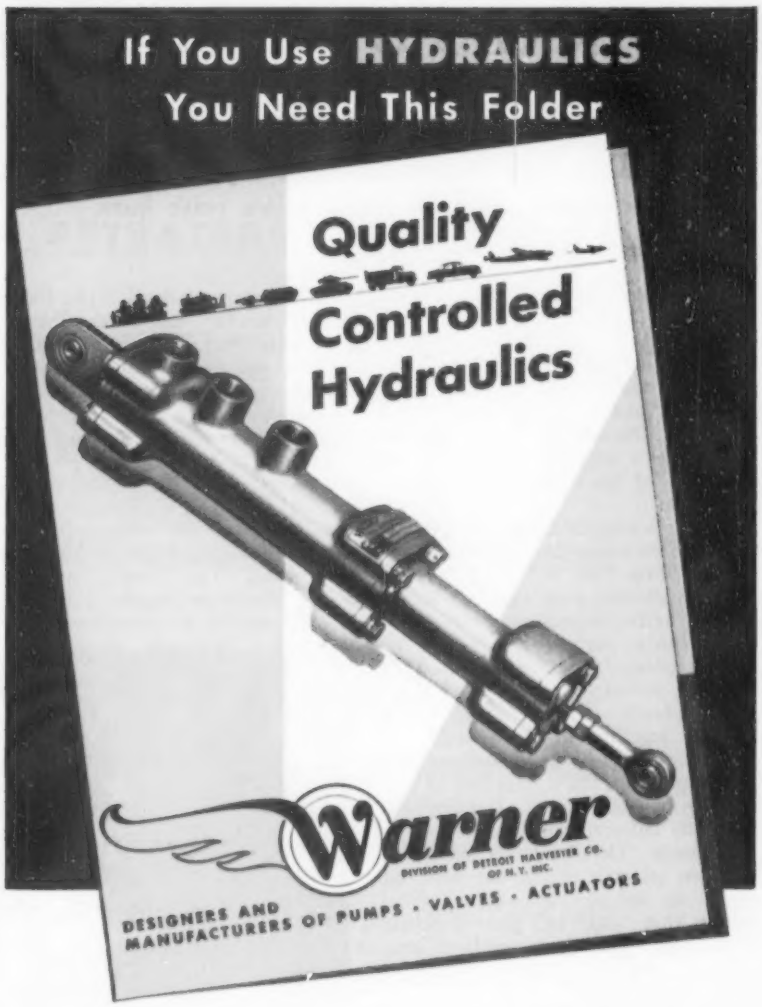
The Model 174-2-A-1, shown above, can chop through cable bundles 1½x2½ in. or fluid lines up to 1½ in. The chopper is an explosive-driven type, propelling a case-hardened steel knife. Power is supplied by a .38-cal. special-propellant cartridge discharged by a firing pin.

In one design, the firing pin is actuated remotely by explosive fuse, ignited electrically from a special explosion valve located some distance from the chopper. Valve is designed to prevent premature operation. An alternate arrangement permits the chopper to be wired directly into an electrical circuit.

Beckman & Whitley Inc., 985 San Carlos Ave., San Carlos, Calif.

LF Ionosphere Probe

Recent interest in the use of low frequency radio navigation and location systems using pulse-and phase-measuring schemes has prompted the National Bureau of Standards to develop a LF recorder to probe the ionosphere. The device, operating at frequencies of 50 to 1,100 kc., records the apparent reflection height of ionosphere layers versus transmitting frequency.



Warner's Extension Power Brake Valve, shown above, has an exclusive hydraulic feed-back feature to give the pilot immediate warning in event of hydraulic system failure. This compact, lightweight, space-saving valve is adaptable to a wide range of system and brake pressures.

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PRODUCTION

Germans Ready to Roll on 'X Day'

Reich air industry has the labor supply, expects payoff on 'research doodles' when Allies raise bars.

By Gerald W. Schroder

(McGraw-Hill World News)

Frankfurt—The nucleus of the new German aviation industry has been created in the form of the Association for the Promotion of Aviation with offices in Duesseldorf. The organization itself is a successor of the old Reich federation of the German Aviation Industry.

Although many of the statements and stories concerning the rebirth of German aviation have been wild guesses and exaggerated prophesies of things to come in the immediate future, some trends can be recognized clearly.

The former "greats" of the German aviation industry including Heinkel, Messerschmitt and Dornier, have banded together in what might be called an informal cartel and are preparing plans for the resumption of production as soon as allied restrictions presently enforced are lifted.

▶ **Research "Doodles"**—Queried about German research during the past few years, an industry association official admits that "you can't prevent people from thinking and from 'doodling' away at their desks in their homes, no matter what the law says."

At the moment no one really knows what people like Dornier, Messerschmitt and Heinkel have on the boards in the way of startling surprises to the aviation world. Dornier, it is rumored, has designed a new amphibian plane; Messerschmitt and Heinkel apparently are concentrating on supersonic aircraft.

Other projects being considered are new cargo planes, new light trainers and new electronic equipment. No definite news on any of these projects can be expected until the contractual agreements between Germany and the Allies have been completely ratified and "X Day"—when Allied restrictions are lifted—has arrived for Germany's aircraft industry.

The industry is not overlooking military production possibilities once the treaties are ratified.

▶ **Exposure to Attack**—One industry spokesman states the German case: "The aircraft production capacity in the European Defense Community nations (exclusive of England) is not sufficient to adequately rearm all the EDC countries. We must fall back on German capacity.

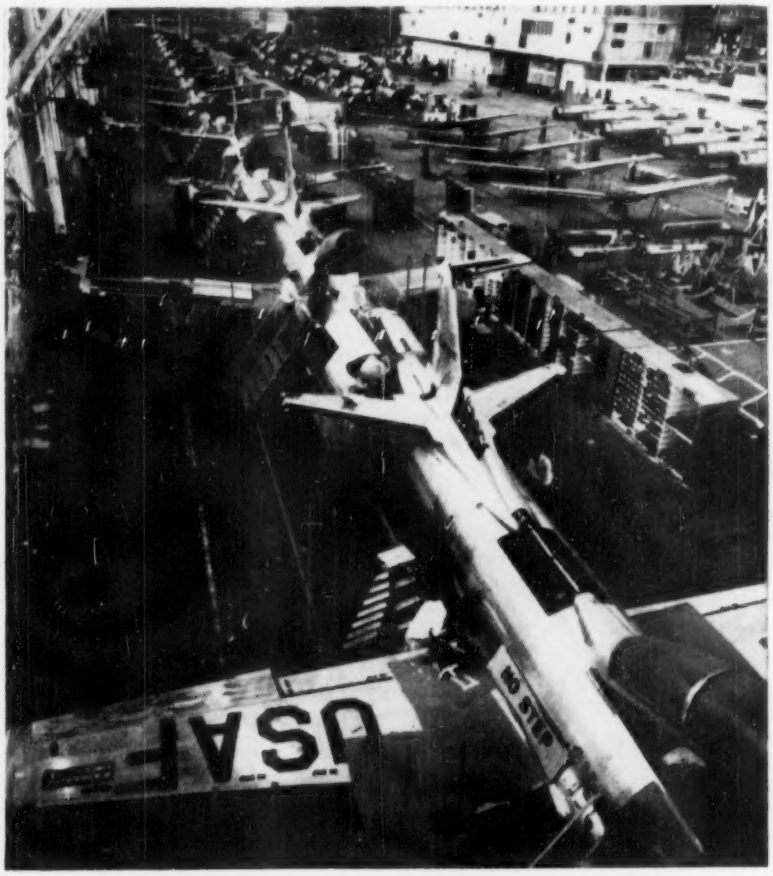
"The argument is often put forward that all territory east of the Rhine is strategically exposed; this is utter nonsense in the air age. Everyone in Europe is equally exposed to attack from the air, so this is no reason to keep Germany from contributing to Europe's military buildup."

▶ **Feeders Intact**—Despite losses caused by World War II, the German aviation industry today still commands a substantial potential both in plants and labor force. The "feeder" industries, which amount to roughly 50% of aviation production, are completely intact. They now, of course, are working on non-aviation orders but can switch to production of aviation materials quickly.

Officials of the industry association state that roughly 300,000 square meters of plant space for plane production is now available in Germany and could be put to good use without major repair costs. Most of the necessary machine tools for the new industry are also available within Germany.

As far as the readily available pool of labor is concerned, the industry is extremely optimistic since it feels that most of the former aviation experts who took employment in other industries after the war will gladly return to the field of aviation, even if it means an initial cut in pay.

In some cases the old plane makers are now producing automobiles, motor rollers, and prefabricated houses, and are giving employment to hundreds of men who formerly worked in the aviation industry. The firm of Heinkel, for example, in Stuttgart now employs about 800 workers on automotive orders; in this case it would be simple to



LOCKHEED BUILDS USAF INTERCEPTOR STRENGTH

View of the Lockheed F-94C Starfire all-weather fighter production line at Burbank, Calif., shows assembled airframes at left and major wing and fuselage sections in the center and right portion of the line. From here Starfires are trucked to Lockheed's Van Nuys factory for final assembly. This version of the interceptor is all-rocket armed.

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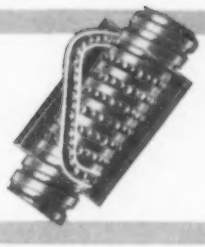

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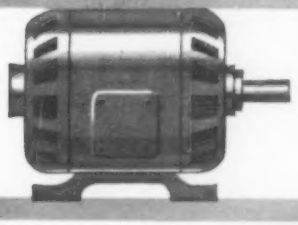

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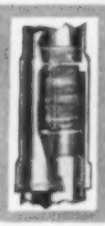

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Short's U. S. Press

(McGraw-Hill World News)

London—A new $280,000 airframe metal press is in operation at Short & Harland Bros., Northern Ireland, following an eight-month jurisdictional squabble by two unions over which workers should start and operate the 75-ton machine.

One union represented engineers and the other metal workers. Now these duties apparently are to be shared.

The machine was imported from the U. S.

switch these workers back to aviation production.

In Hamburg, the plant of Blohm & Voss, now under British supervision, employs 1,500 men in the repair of tanks and cars. Again these men represent an available trained labor force once plane production has been resumed in Germany.

▶ **Money Problems**—One of the greatest problems facing the new German aviation industry is that of financing. The industry still has money owed to it for deliveries to Hitler's Reich. Even though the currency reform in 1948 reduced these claims a great deal, the companies may still have to find a way of collecting these claims from the new German government.

At the same time, many of the old aviation companies still owe money to the German banks that succeeded the Reichsbank. These debts, too, were reduced at a ratio of 10 to 1 by the currency reform, but even so they are said to amount to 150 to 200 million deutschmarks ($35.7 to $47.6 million).

As long as the problem of these old debts is not cleared up it may be difficult to raise new bank loans.

Industry officials feel, however, that some arrangement can be worked out whereby a new cooperative association, unburdened by old debts, can raise money on the basis of newly created assets. Some plants also, like Weser-Flug in Bremen, have no debts at all at the moment.

▶ **U. S. Help**—Germans point out that it will be American orders which will get them started in the initial phase of rebuilding the industry. They also feel that only the United States is in a position now to create the "political climate" which will make it possible for them to resume production. One of the plans now being mentioned is that of building planes for American firms on a license basis and to sell these planes to Near East countries for deutschmarks.

The Germans feel that, within a very short time, they will be able to compete successfully with British and American plane makers.

"Where, for example, an American plane maker has to pay a worker two dollars per hour, our prevailing wage rate is 2 deutschmarks per hour, or about 46 U.S. cents," one industry association official states. "Thus we can spend relatively more on labor and start with fewer expensive machines and more primitive methods."

▶ **Wait for X Day**—"French and British economic fears of a revived German aircraft industry may impose some handicaps on us," this same official candidly admits.

"We'll soon catch up with the British and they know it," he says. "They may try to prevent this for as long as they can. But we Germans live to work, while others work to live; so we're not worried about catching up with the outside world.

"We're just waiting for X Day when all restrictions are dropped and we're let off the leash. To earn money for our own research, which takes lots of time and cash, we'll build on license basis for the first five years, probably. But these years will only be 'training years'; we'll use them to train our own production and design items and get our plants in shape. But no matter how we start, you'll see the first planes roll off German production lines within a year after X Day."

▶ **"Schuman Plan" for Air?**—The Germans hope for the eventual establishment of an "Aero Union" of European nations, along the lines of the Schuman Plan.

They have been approached lately along these lines by the French and the Italians and it appears probable that this project may be realized within the next few years.

The Germans did, however, turn down one French offer of cooperation recently, industry officials say. Apparently, the French wanted the Germans to join them in setting up an aircraft industry in North Africa. To the Germans this proposal was "economically uninteresting."

"As long as you can't use native labor and must, instead, transport thousands of German aircraft workers to North Africa, the project becomes automatically impossible," the Germans are reported to have replied. The plan appeared "stupid" to the Germans especially in view of the fact that the necessary "feeder" industries would have remained thousands of kilometers away in Europe.

Nonetheless, the Germans hope that political obstacles in the way of cooperation with the French and other European nations will be removed in the near future.

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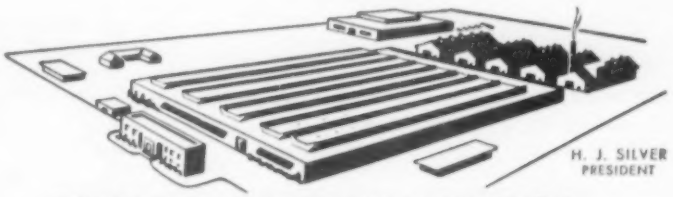

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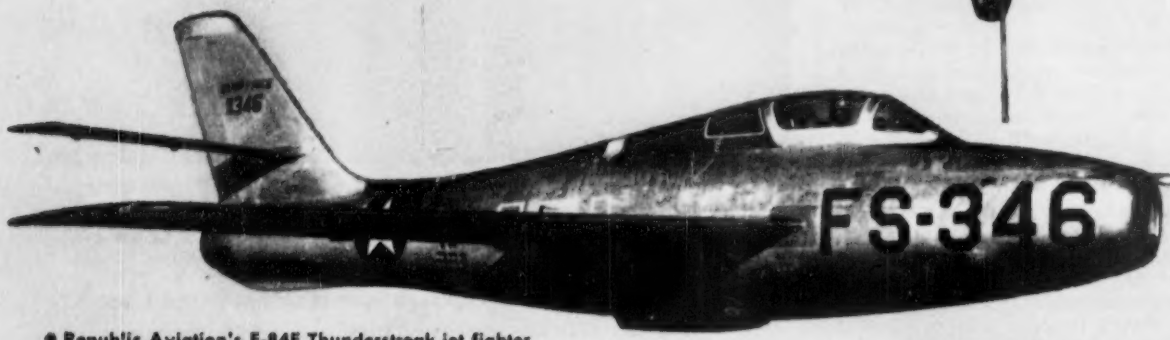


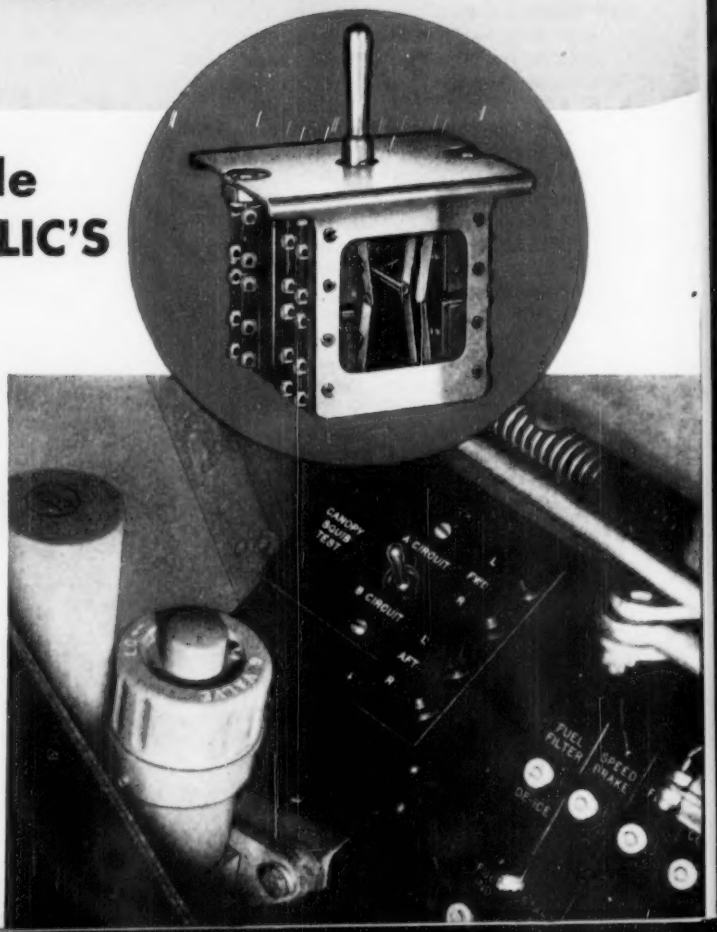
• Republic Aviation's F-84F Thunderstreak jet fighter which depends on MICRO toggle switches for important electrical controls

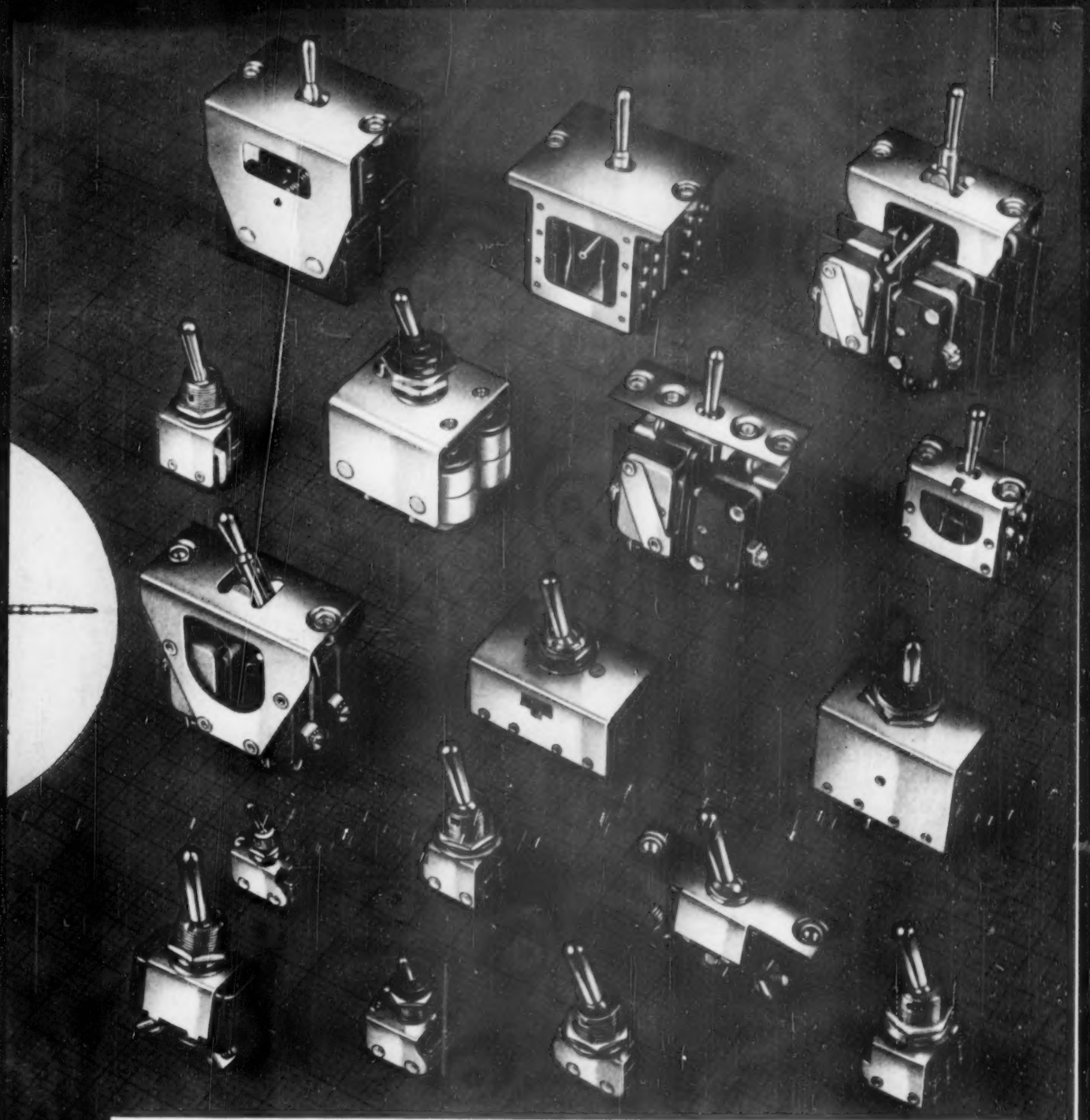
Provide accurate multiple circuit controls in REPUBLIC'S F-84F Thunderstreak

• Control of important electrical circuits in the new REPUBLIC F-84F Thunderstreak jet fighter is the function of MICRO's 3AT16 Toggle Switch . . . an assembly of 16 subminiature switches operated by a single bat handle.

The MICRO subminiature switches used in this assembly are less than 3/4" long and weigh less than 1/15 of an ounce. The assembly provides an unusually efficient, compact and lightweight assembly for the control of sixteen circuits. Eight of the switches operate with each direction of the toggle motion.

At the right is shown the MICRO toggle switch assembly before and after installation in the cockpit of the Thunderstreak.





• Here are seventeen different types of MICRO toggle switches developed to meet the most exacting requirements of aircraft design engineers. Whether design calls for a toggle switch (a) hermetically sealed for immunity against altitude or environmental changes, or (b) with sealed toggle lever, or (c) extremely small to fit in close quarters, or (d) assemblies for switching multiple units . . . MICRO has the switch assembly to best fit your needs.

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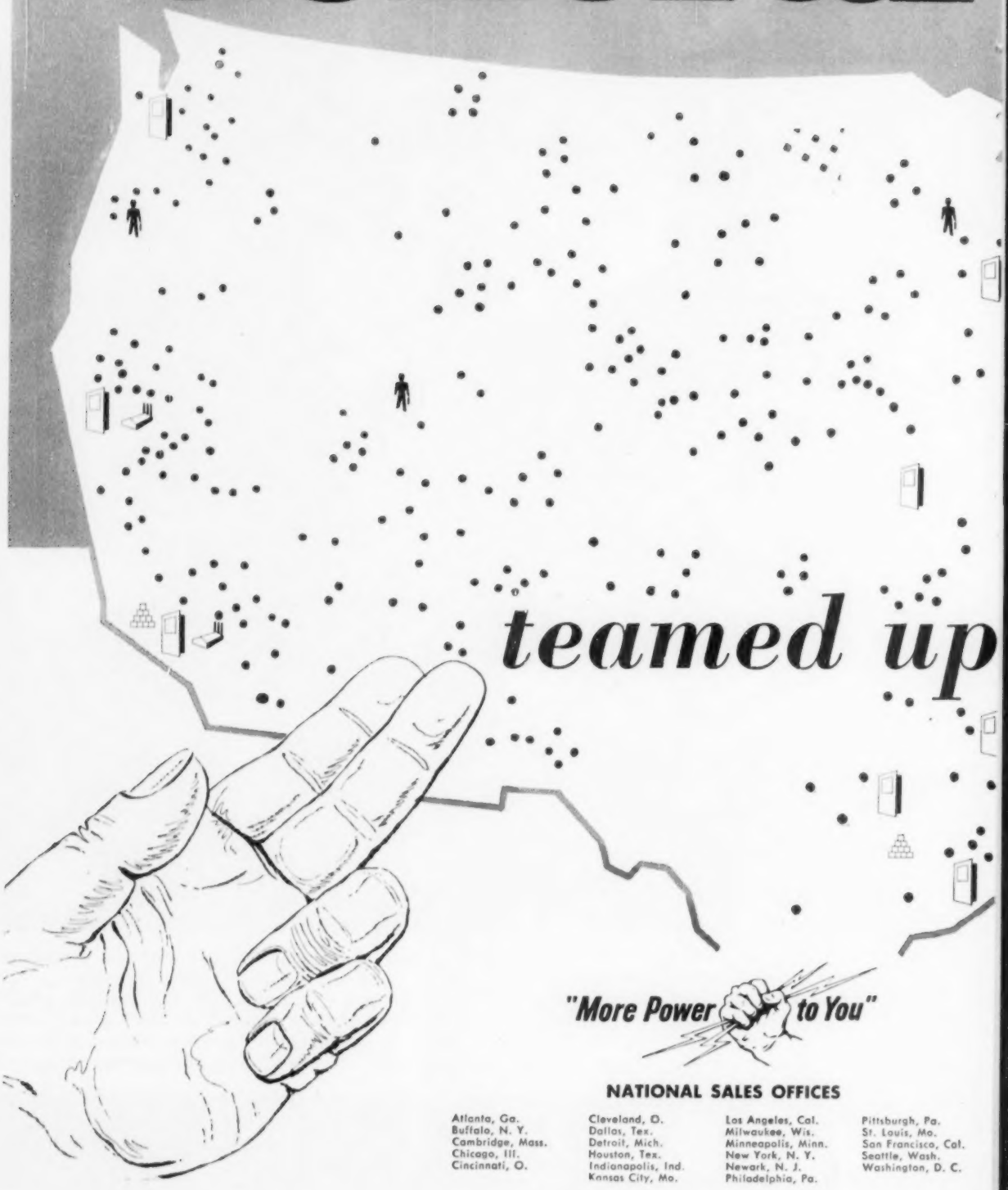

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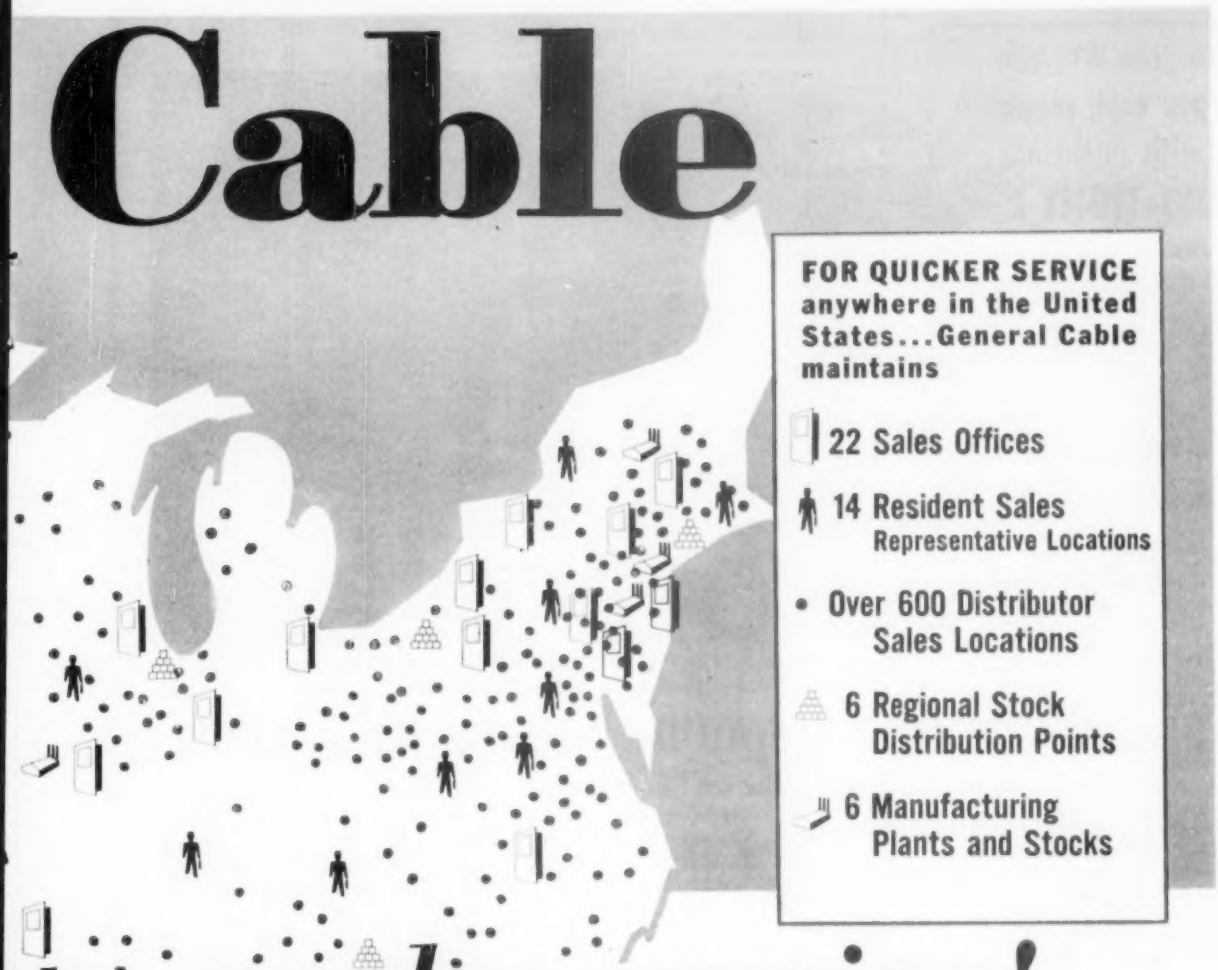

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"There doesn't seem to be anything to compare with Pastushin FLUID-TIGHT rivets. We've made them shop practice," says Capital Airlines Maintenance Manager R. L. Wageneck.

Capital, like many other airlines and aircraft manufacturers has discovered this fact: Pastushin FLUID-TIGHT rivets save maintenance man-hours, and do a better job wherever full-strength, permanent leak-proof joints are required.

Pastushin FLUID-TIGHT rivets are fully approved by Air Force, Navy and C.A.A.

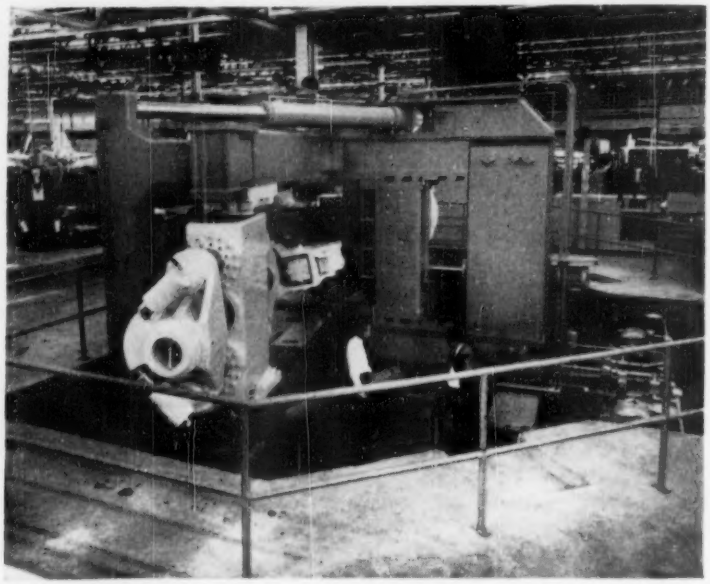
ADVANTAGES

- Completely leak-proof
- Easy to install
- Full rivet strength values
- Replaces standard AD rivets without loss of joint efficiency
- Uses conventional riveting tools and methods
- All sizes and shapes available

Write for full information and catalog PI-2

PASTUSHIN INDUSTRIES, INC.
501 Prairie Avenue
Hawthorne, Calif.
OSborne 6-7721

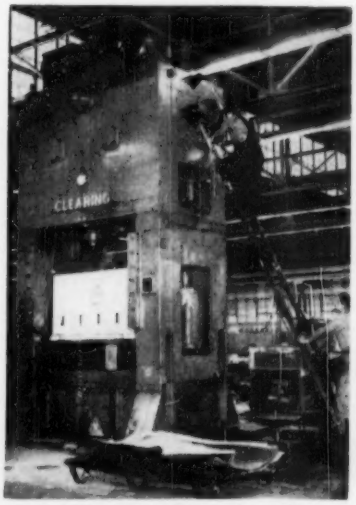
Aviation Week Picture Brief



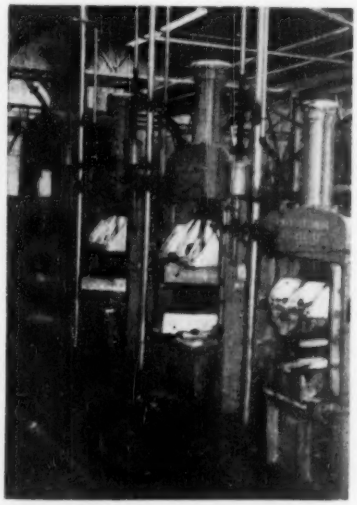
HUFFORD STRETCH PRESS is used to shape fuselage skins and doublers, and in-duct nose beam assembly skins. Unit has 93-ton capacity.

Republic Installs New Tools

More than 600 tons of new machinery for speeding production at Republic Aviation Corp., Farmingdale, N. Y., has been put into operation. Procurement and plant layout for the new equipment were begun back in 1950. In addition to the installations shown here, there are an electrically heated salt bath unit for 850F temperatures to accommodate sheet materials, and two new 12,000-lb.-capacity gas-fired lead melters to furnish all the lead and Kirksite required for molding Republic's forming dies for press and drop hammer operations. Two new compressors furnish 4,000 cfm. of air at required working pressure for 4,600 new air-driven tools. Preparations are being made for housing machinery to run four new chain conveyor lines for F-84F production. These conveyors will have a 300,000-lb. pull.



CLEARING PRESS with 400-ton capacity blanks and forms aluminum and stainless sheet into detail parts.



CECOSTAMPS form compound curves and irregular parts other presses can't handle. New 88-tonner is in rear.

Fiat and Snecma Sign S-55 Pact

(McGraw-Hill World News)

Rome—The Italian aircraft firm, Fiat, has signed an agreement with the nationalized French firm, Societe Nationale de Constructions Aeronautiques du Sud-Est, to aid in the production of Sikorsky-designed S-55 helicopters. Sncase obtained the license to build the S-55 in Europe from Sikorsky's British licensee, Westland Aircraft Ltd.

Sncase recently demonstrated an S-55 bearing French markings at Urbe Airport near Rome, to Prof. Valletta, president of Fiat, and other officials.

PRODUCTION BRIEFING

▶ **Barber-Colman Co.**, maker of aircraft actuators, controls systems, relays, valves and small motors, has moved its eastern office to 149 Hillside Ave., Williston Park, N. Y. Phone number is Garden City 3-5313.

▶ **Bell Aircraft Corp.**, Buffalo, N. Y., is shutting down its Niagara Frontier Div. for vacation period Aug. 1-Aug. 16 inclusive.

▶ **Longren Aircraft Co.**, Torrance, Calif., has formed a Machine Building Div. to manufacture and market specialized metal forming presses and equipment.

▶ **Republic Aviation Corp.**, Farmingdale, N. Y., has set up a material department and an inventory control division to handle, store and issue materials and parts. The system was set up by Booz, Allen and Hamilton, management consultants.

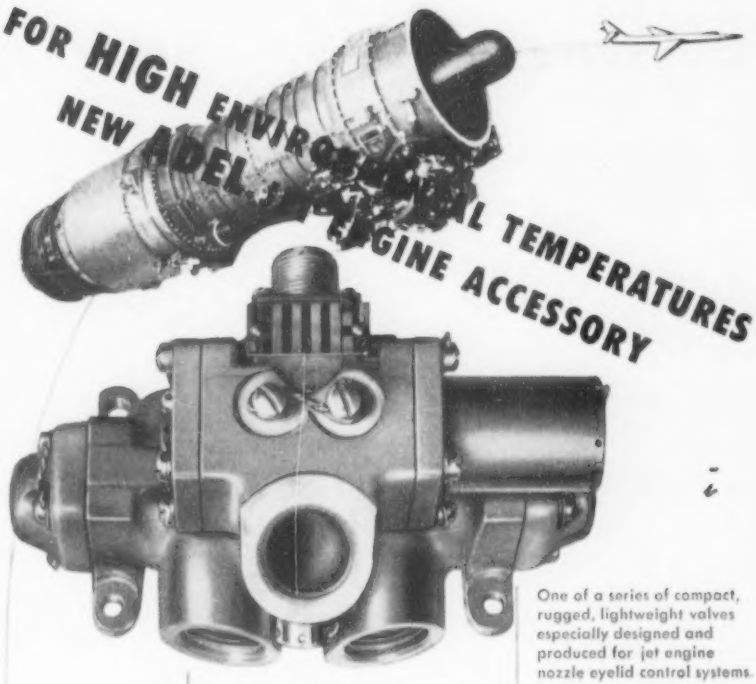
▶ **Rheem Mfg. Co.'s Aircraft Div.** is putting up a 66,000-sq. ft. engineering building adjacent to the firm's Downey, Calif., plant. Completion is scheduled for Sept. 1.

▶ **Eutectic Welding Alloys Corp.**, Flushing, N. Y., has broken ground for a new plant which will house a 273-ft.-long fully mechanized production line.

▶ **Sprague Electric Co.**, North Adams, Mass., is building a plant seven miles from West Jefferson, N. C., for manufacture of capacitors. Expected to be completed about Nov. 1, the plant will employ 250 at full schedule.

▶ **Aircraft Products Div.**, Manning, Maxwell & Moore, Inc., has established a West Coast office and plant at 750 So. Iris Ave., Inglewood, Calif., near

FOR HIGH ENVIRO[illegible]L TEMPERATURES
NEW ADEL [illegible]NGINE ACCESSORY



One of a series of compact, rugged, lightweight valves especially designed and produced for jet engine nozzle eyelid control systems.

OPERATION

A Spring Offset, Two Position, Solenoid Operated, Four Way Valve using engine oil to operate hydraulic cylinders.

B Solenoid energized, 3000 psi at inlet port produces outflow at cylinder 1—cylinder 2 open to return.

C Solenoid de-energized, produces outflow at cylinder port 2, cylinder 1 open to return.

CHARACTERISTICS

1 Ambient temperature range −65° to +350°F.
2 Operating pressure 3000 psi.
3 Ports per AND10050 are available in 1/4", 5/16", 3/8", and 1/2" tube sizes.
4 No packing on sliding members.
5 Operating voltage 18-30 VDC.
6 Current required 1.0 amp. at 30 volts.
7 Continuous duty solenoid.
8 Pilot valve spring loaded against pressure to 4000 psi min.
9 Operating fluid MIL-L-7808.
10 None interflow type valve.
11 Weight 1.75 lbs.

ADEL produces a complete line of Aircraft HYDRAULIC & PNEUMATIC CONTROL EQUIPMENT, HEATER, ANTI-ICING & FUEL SYSTEM EQUIPMENT, ENGINE ACCESSORIES AND LINE SUPPORTS.

For better, safer jet engine performance—Specify ADEL

ADEL LEADER IN ENGINE ACCESSORIES

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CANADIAN REPRESENTATIVE: RAILWAY & POWER ENGINEERING CORPORATION, LIMITED

Eclipse-Pioneer

CORROSION-RESISTANT AUTOSYN* SYNCHROS

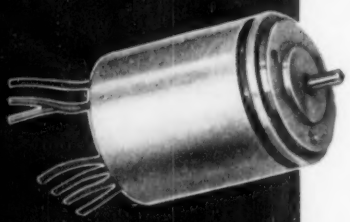
(AY-200 SERIES)

TYPICAL ELECTRICAL CHARACTERISTICS

	Type Number	Input Voltage Nominal Excitation	Input Current Milliamperes	Input Power Watts	Input Impedance Ohms	Stator Output Voltage Line to Line	Rotor Resistance (DC) Ohms	Stator Resistance (DC) Ohms	Maximum Error Spread Minutes
Transmitters	AY2015-26	26V, 400~, 1 ph.	175	0.8	40+j230	11.8	12	8.8	18
Control Transformers	AY2015-25	From Trans. Autosyn	Dependent Upon Circuit Design				40	10.2	20
Differentials	AY2215-26	From Trans. Autosyn	Dependent Upon Circuit Design				14	10.2	30
Resolvers	AY2215-26	26V, 400~, 1 ph.	70	0.4	100+j440	11.8	80	11.4	24

PYGMY AUTOSYN SYNCHROS

(AY-500 SERIES)



TYPICAL ELECTRICAL CHARACTERISTICS

	Type Number	Input Voltage Nominal Excitation	Input Current Milliamperes	Input Power Watts	Input Impedance Ohms	Stator Output Voltage Line to Line	Rotor Resistance (DC) Ohms	Stator Resistance (DC) Ohms	Maximum Error Spread Minutes
Transmitters	AY503-4	26V, 400~, 1 ph.	220	2.5	45+j100	11.8	23.0	11.0	24
Receivers	AY503-2	26V, 400~, 1 ph.	220	2.5	45+j100	11.8	23.0	11.0	75
Control Transformers	AY503-3	From Trans. Autosyn	Dependent Upon Circuit Design				170.0	45.0	24
	AY503-5	From Trans. Autosyn	Dependent Upon Circuit Design				550.0	180.0	30
Differentials	AY523-3	From Trans. Autosyn	Dependent Upon Circuit Design				93.0	45.0	30
Resolvers	AY523-3	26V, 400~, 1 ph.	55	0.5	290+j490	11.8	210.0	42.0	30
	AY543-5	26V, 400~, 1 ph.	11	0.12	900+j2200	11.8	960.0	165.0	30

Available for all applications is the new, *corrosion-resistant* AY-200 Series of Eclipse-Pioneer Autosyn Synchros (1.431" dia. x 1.631" lg.). Where space and weight are prime considerations, Eclipse-Pioneer offers the AY-500 Pygmy Autosyn Synchro Series (0.937" dia. x 1.278" lg.) with corrosion-resistant models available in sample quantities. Whatever your synchro requirements may be, our long experience, modern facilities and advanced production techniques can work to your advantage. For full details, write Department H.

*Registered trade-mark Bendix Aviation Corporation

THE NAME Bendix AVIATION CORPORATION MEANS "BEST"

ECLIPSE-PIONEER, Division of
TETERBORO, N. J.

Export Sales: Bendix International Division, 205 E. 42nd St., New York 17, N. Y.

the International Airport. The company (headquarters in Stratford, Conn.) makes jet engine temperature control amplifiers, pressure switches and gages, hydraulic valves and afterburner control systems.

▶ **Set Screw & Mfg. Co.**, Bartlett, Ill., has acquired from Shakeproof Div. of Illinois Tool Works the facilities for manufacture and sale of offset self-locking set screws to be marketed under trade name Setco.

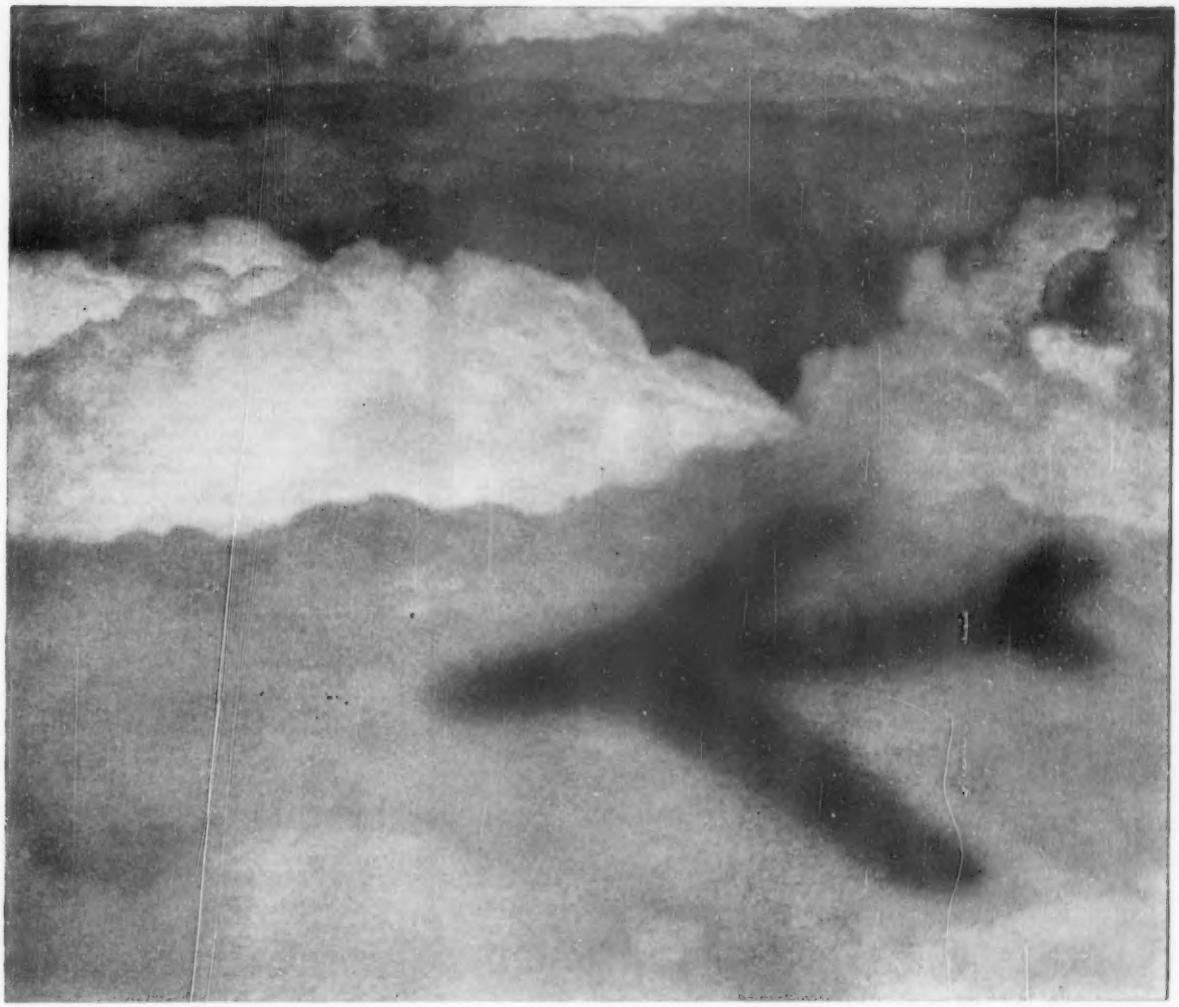
▶ **Industrial Reflector Co.**, Dallas, Tex., has purchased the all-angle taxiway reflector formerly manufactured by the Rio Grande Distributing Co.

Fast Writeoffs

Accelerated tax amortization for manufacturers expanding their defense facilities is granted by the government in the form of certificates of necessity.

In the following list of recently certificates, company name is given, followed by product or service, cost of construction deemed necessary for defense expansion, and the percentage of the expansion cost allowed for fast writeoff. Fast writeoff permits property to be depreciated in five years.

- **Consolidated Industries, Inc.**, West Chehire, Conn., aluminum, steel & titanium forgings for aircraft, $149,135, 65%.
- **United Tool & Die Co.**, West Hartford, Conn., aircraft parts, $88,420, 70%.
- **M. B. Mfg. Co., Inc.**, New Haven, Conn., aircraft parts, $169,838, 70%.
- **Congoleum-Nairn Inc.**, Kearney, N. J., aircraft parts, $10,110, 65%.
- **Magnus Tool & Die Co.**, Newark, N. J., aircraft parts, $23,550, 70%.
- **Eastern Air Lines, Inc.**, New York, air transportation, $1,277,193, 80%.
- **Westinghouse Electric Corp.**, Pittsburgh, research and development of aircraft parts, $6,591,809, 65%.
- **Fairchild Engine & Airplane Corp.**, Hagerstown, Md., aircraft and aircraft parts, $49,330, 65%.
- **Jack & Heintz, Inc.**, Cleveland, aircraft electrical equipment, $333,263, 60%.
- **Type Machine Co.**, Cleveland, aircraft parts, $33,940, 70%.
- **Ward-Riddle Co.**, Ravenna, Ohio, aircraft parts, $22,374, 70%.
- **Continental Motors Corp.**, Muskegon, Mich., aircraft components, $1,901,000, 60%.
- **Oliver Corp.**, Battle Creek, Mich., aircraft components, $74,445, 50%.
- **Borg-Warner Corp.**, (Norge Div.), Muskegon Heights, Mich., aircraft parts, $134,250, 50%.
- **Flying Tiger Line, Inc.**, North Hollywood, Calif., air transportation, $141,000, 35%.
- **Harvey Machine Co., Inc.**, Torrance, Calif., large aluminum extrusions for aircraft, $1,340,000, 65%.
- **Bendix Aviation Corp.** (Pacific Div.), ordnance and aircraft parts, $43,218, 65%.
- **Weber Aircraft Corp.**, Burbank, Calif., aricraft parts, $38,493, 65%.
- **Lockheed Aircraft Corp.**, Burbank, Calif., aircraft, $448,899, 60%; aircraft & aircraft parts, $90,472, 60%.
- **Douglas Aircraft Co., Inc.**, Santa Monica, Calif., aircraft, $257,540, 60%.
- **B. H. Hadley Co.**, Pomona, Calif., aircraft parts, $35,990, 70%.
- **Douglas Aircraft Co., Inc.**, Long Beach, Calif., aircraft, $35,292, 65%.
- **Douglas Aircraft Co., Inc.**, El Segundo, Calif., aircraft & aircraft parts, $53,168, 60%.



Coming—another great Boeing

A history-making airplane is today taking shape in a Seattle plant. It is Boeing's prototype "Project X" jet transport.

There is real need and opportunity, both in military and commercial fields, for such an airplane — jet-powered for speed and smooth performance — large enough for ample range and capacity.

A jet tanker would make available to strategic air power the full potential of swift jet bombers — flying with them on long-range missions and refueling them in flight at their own choice of altitude and speed. The rapid transport of high-priority military personnel and cargo also calls for jet power. Commercial airlines are evidencing increased interest in a jet transport which will offer new speed and provide economically feasible operation.

The Boeing prototype airplane, now well along in construction, is being built as a demonstrator model. It will be completed and flying in 1954. The early construction of this prototype, made possible through the use of Boeing's own funds, provides an advantage that will be shared in by its customers. It will make possible the building of production airplanes at lower cost and in a shorter time than if production orders were not preceded by the design and construction of a prototype. It will offer an early opportunity to develop and prove out engineering, production and operational details.

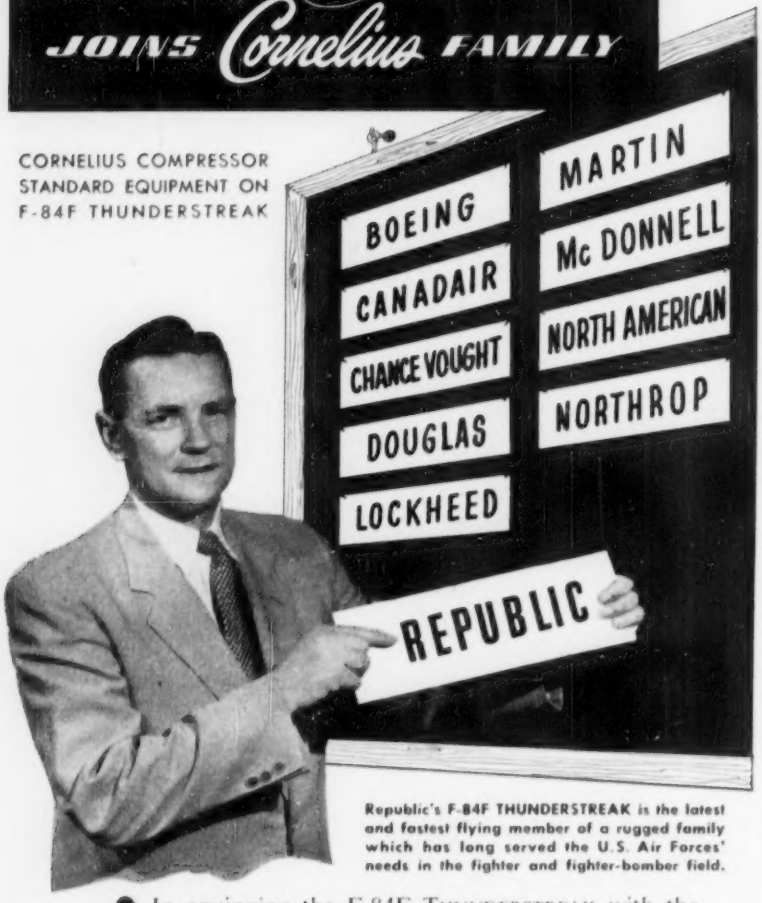
It is logical that Boeing should have undertaken this project. No other company in the world possesses such a background of experience in designing, building and flying multi-jet aircraft. More than 14,500 hours of aerodynamic research in Boeing's own wind tunnel and more than 5000 hours of test and research flying have gone into the development of the B-47 Stratojet medium bomber and the B-52 eight-jet heavy Stratofortress.

The company's 36-year record of integrity in research, design, engineering and manufacturing gives assurance that the new airplane will be another great Boeing.

BOEING

REPUBLIC AVIATION JOINS Cornelius FAMILY

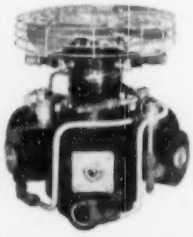
CORNELIUS COMPRESSOR STANDARD EQUIPMENT ON F-84F THUNDERSTREAK



Republic's F-84F THUNDERSTREAK is the latest and fastest flying member of a rugged family which has long served the U.S. Air Forces' needs in the fighter and fighter-bomber field.

● In equipping the F-84F THUNDERSTREAK with the CORNELIUS AIR COMPRESSOR Republic Aviation joins the CORNELIUS family of famous names in aviation ... Boeing, Canadair, Chance Vought, Douglas, Lockheed, Martin, McDonnell, North American, Northrop.

CORNELIUS is proud of this recognition ... developed from long experience building dependable pneumatic equipment for the Air Force, Navy and leading aircraft manufacturers. Profit from our experience ... write to us about your pneumatic equipment requirements.



CORNELIUS COMPRESSOR
4CFM ... 3000 PSI
Powered by integral hydraulic motor. Other models available with various pumping capacities. All compressors can be furnished with either hydraulic motors, DC electric motors or AC 400 cycle motors.

THE Cornelius COMPANY
MINNEAPOLIS 21, MINNESOTA

Pioneers in the Development of
AIRCRAFT PNEUMATIC SYSTEMS

USAF Contracts

Following is a list of recent USAF contracts announced by Air Materiel Command.

Eclipse Pioneer Div., Bendix Aviation Corp., Teterboro, N. J., fuel flowmeter, transmitter, 649 ea.; fuel pressure transmitter, 529 ea.; torque pressure indicator, 6 ea., $197,668.

Goodyear Tire & Rubber Co., Inc., 1144 E. Market St., Akron, wheel assys., 634 ea., 598 ea.; brake assys., 635 ea., $1,126,548.

Hydro-Aire, Inc., 3000 Winona Ave., Burbank, Calif., spare parts, $86,218.

Lear, Inc., 110 Ionia Ave., N. W., Grand Rapids, Mich., special tools & test equipment, 2,266 ea.; packaging & packing, maintenance data, table 3, part B, basic; $1,996,024; vertical gyro indicator, remote, 1,162 ea.; vertical gyro control, remote, 1,203 ea., spare parts, $4,908,986.

Lewis Engineering Co., 339 Church St., Naugatuck, Conn., lead thermocouple iron constantan, 3,743 ea.; indicator temp eng. exhaust, 208 ea.; thermocouple assy., 2,000 ea., $58,105.

Lockheed Aircraft Corp., Burbank, Calif., repair of GFAE, $110,000.

Phaostron Co., 151 Pasadena Ave., South Pasadena, Calif., control stick switch, 6,994 ea., 3,651 ea., $83,253.

Alco Valve Co., 865 Kingsland Ave., St. Louis, gasket, 152 ea., arm assy., link assy., 152 ea., $26,767.

Bachman Wholesale Co., PO Box 237, Rochester, N. Y., gun turret parts, $76,798.

Barber-Colman Co., Rockford, Ill., spare parts & data, $84,313.

Chicago Aerial Survey Co., 332 S. Michigan Ave., Chicago, amplifier type h-1, 300 ea., master controls, type C-4, 300 ea., amplifier type H-1, 1,531 ea., $185,020; spare parts for CAS-2 & CAS-2a cameras and for MA-10 & MA-10A magazines, $202,267.

Chicago Pneumatic Tool Co., 570 E. Larned St., Detroit, spare parts, $174,942.

Delco Products Div., General Motors Corp., Dayton, motor assy., 16 ea., 623 ea., $44,442.

Electric Storage Battery Co., Philadelphia, batteries, acft storage, 2,318 ea., nipple, battery vent, 4,143 ea., $47,761.

GMC Truck & Coach Div., General Motors Corp., 660 S. Blvd., East Pontiac, Mich., truck, cargo, 163 ea., spare parts, 1 lot, $1,994,533.

General Electric Co., 1 River Rd., Schenectady, N. Y., turbo regulator systems, 289 ea., $248,507.

Gill Electric Mfg. Corp., Redlands, Calif., batteries, acft storage, 1,500 ea., $70,890.

Hayes Aircraft Corp., PO Box 2287, Birmingham, Ala., materials & services to design propeller control system for C-45F and/or G aircraft, materials & services to

Stratos Div.
Fairchild Engine & Aircraft Corp.

furnish supporting spare parts for T.O.'s., $239,714.

Holley Carburetor Co., 5930 Vancouver Ave., Detroit, carburetor spare parts, $70,695.

Hotpoint Co., General Electric Co., 5600 W. Taylor St., Chicago, turbo supercharger, 339 ea., 258 ea., 22 ea., $4,294,636.

Interstate Engineering Corp., 2250 Imperial Highway, El Segundo, Calif., arm assy., 402 ea., 486 ea., $26,640.

Jack & Heintz, Inc., Cleveland, electrical starters for aircraft, 1,469 ea., $331,484; direct cranking starters, 14 ea., 1 ea., 4 ea., $121,995.

Kearfott Co., Inc., Little Falls, N. J., components of type N-1 compass system, $5,064,370.

Leland Electric Co. Div., American Machine & Foundry Co., 1501 Webster St., Dayton, inverter, 775 ea., 52 ea., 52 ea., spare parts, 52 ea., $319,892.

North American Philips Co. Inc., 750 S. Fulton Ave., Mount Vernon, N. Y., remote tuning assy., 500 ea., $130,864.

Propeller Div., Curtiss-Wright Corp., Caldwell, N. J., propeller assy., 69 ea., 60 ea., 19 ea., $937,232.

Royal Electric, Inc., Jamestown, Ohio, single phase inverters, 941 ea., $404,761.

Scintilla Magneto Div., Bendix Aviation Corp., Sidney, N. Y., exciter ignition units, 369 ea., $167,987.

Sperry Gyroscope Co., Sperry Corp., Great Neck, N. Y., power supply amplifier 14 ea., cycle switch, 14 ea., condition switch, 14 ea., $74,923.

Ternstedt Div., General Motors Corp., Detroit, type V-7A indictor, spare parts, special tools data, $238,954.

United States Gauge Div., American Machine & Metals, Inc., Sellersville, Pa. hydraulic transmitter, 11,626 ea., spare parts, special tools, test & handling equipment, $1,028,777; multipurpose, transmitter, 1,443 ea., $113,080; oil pressure transmitter, 811 ea., $53,020.

York Corp., 659 E. Sixth St., Cincinnati, modify ammonia refrigeration system, $97,438.

Navy Contracts

The following contracts were announced recently by the Navy's Aviation Supply Office, 700 Robbins Ave., Philadelphia 11.

Lockheed Aircraft Corp., Burbank, Calif., tank assys., $123,186.

Pesco Products Div., Borg-Warner Corp., 24700 N. Miles Rd., Bedford, Ohio, pump assys. for various aircraft, 262 each, $28,559.

Piasecki Helicopter Corp., Morton, Pa., spare parts for helicopters, $37,669.

Reliance Chemical Co., Lee Terminal Standiford Field, Louisville, Ky., thinner, cellulose nitrate, 53,000 gal., $37,577.

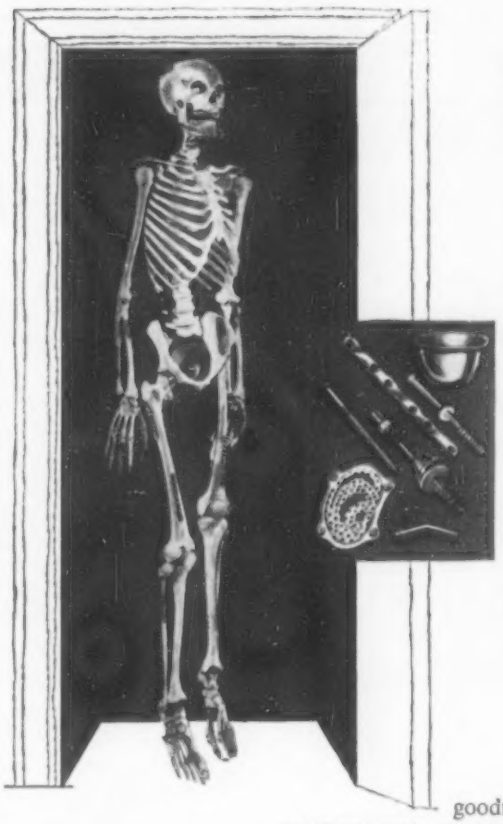
George Senn, Inc., 2200 E. Westmoreland St., Philadelphia 34, thinner, cellulose nitrate, $105,340.

Sperry Gyroscope Co., div. of the Sperry Corp., Great Neck, N. Y., indicators, $253,861.

Superior Paint & Lacquer Wks., 6231 Maywood Ave., P. O. Box 271, Huntington Park, Calif., camoflage paint, 46,540 gal., $67,483.

Pratt & Whitney Aircraft Div., United Aircraft Corp., E. Hartford 8, Conn., spares and parts for P&W engines, $6,961,489; $119,519; $30,536; $262,400; $25,579; $277,814; $38,930; $25,121; $411,283; $207,375; $121,642; $142,733; $86,967; items for support for the YT-34-P1, $111,239; tools for P&W aircraft engines, $127,400; parts for P&W J57-P7 engines, $799,790; spare parts for P&W engines, $330,876; $190,413; pump & pie assys. for P&W aircraft engines, $358,962; spare parts for overhaul of engines, $1,893,359; coupling assys. for P&W engines, $165,429.

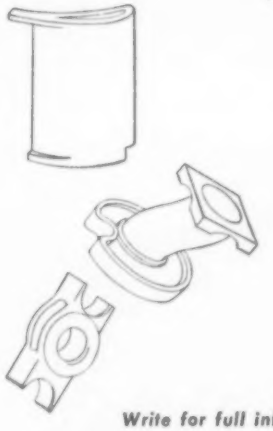
United Aircraft Corp., Hamilton Standard Div., Windsor Locks, Conn., gear, $58,123; parts for repair of 1M, 3G, 4G governors, $64,755; spare parts for HSD propellers, 20 each, $68,460; 235 each, $367,443; shaft assys., gears, pawls, $28,608; maintenance and overhaul parts for propellers, $56,469.



There's a Skeleton in Our Closet... and we're proud of it...

Meet our honest-to-goodness skeleton used to exhibit dental and bone surgical appliances produced from non-machineable high temperature alloys by the MICROCAST precision investment casting process. We're proud of him because he demonstrates the ability of MICROCAST to work with the toughest of metals and alloys.

Originated in 1929 by Austenal Laboratories, Inc., MICROCAST has since been used to precision cast dentures; bone surgical appliances; parts and components for bombers, jet engines, machines, appliances, and for a growing list of industrial and consumer products. This LOW-COST metalworking process offers unusual advantages in the mass production of small, intricately shaped parts.



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Notes From the North—A Reporter's Roundup

Canadian Airlines: 'Jalopies' to Jets

- **Planes are as varied as terrain, weather.**
- **Wheels, skis and floats are standard equipment.**

By George L. Christian

Vancouver, British Columbia—In Canadian skies one sees extremes. Super-modern jet Comets and old "crates" like the Junkers W33 (1928 vintage) are in the air. You can probably find even older relics operating if you dig around the North Country.

Between the extremes, Canadians fly a bewildering assortment of aircraft over (and sometimes through) their celebrated bushland. In three weeks up here, I saw old and obsolete Fairchild 71s and Bellanca Skyrockets, still-sleek Barkley-Grow T8P-1s and Anson Mk. 5s, dependable Noorduyn Norsemen and de Havilland Beavers, amphibious Consolidated Cansos and Grumman Widgeons, to name but a few. A lone Bristol Freighter is supplying a gold mine out of Yellowknife.

Many of the planes are triphibians—fitted with wheels, skis and floats. There is a saying up here, and it seems largely true: "Canadians put anything that flies on floats."

VICKERS VISCOUNT turboprop airliner will look like this with TCA markings. The carrier expects delivery in 1954 of the Dart-powered British transport.

FAIRCHILD 71 is typical oldtimer used by Canadian bush airline operators.

BELL 47D-1 takes off from Canadian aluminum project's mountainside camp.

Trans-Canada Air Lines

Just as the planes and conditions that Canadian carriers work with are varied, so are their outlooks and operations.

Some of the high spots are touched on in this story. Later articles will describe Canadian airline activities in detail.

The largest government-owned airline, TCA, has modified its domestic North Stars to accommodate 48 passengers instead of the original 40. This sometimes results in a space-limited condition—flights may leave the ground some 1,400 lb. under the plane's maximum takeoff weight of 80,400 lb.

English Godfrey cabin superchargers are giving an excellent account of themselves, TCA officials say. Their overhaul period is high, failure rate low, and they are inexpensive to operate and overhaul.

Generally, domestic North Stars are

Muscular Power

that controls the McDonnell "Banshee"

Even before she leaves the deck of a Navy Carrier, her pilot has this swift jet under finger-tip control . . . elevator trim tabs and wing pins moved and positioned by Lear electro-mechanical actuators.

Through Lear drive systems incorporating Screw Jacks, "T" Drives and Flexible Shafting, the Lear Power Unit illustrated transmits the required power.

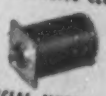
Engineered to meet the specialized requirements of the "Banshee"... and other well-known aircraft . . . Lear Control and Actuating Systems provide space-saving power. On the "Banshee" such power is at the pilot's instant command through touch of a button or via automatic controls.

In aircraft large and small, military and commercial, Lear Controls, Actuating Systems and Components are making flight smoother, faster, more economical . . . and safer.

LEAR POWER UNIT Series 156
Typical of units designed for the McDonnell F2H-2. Specially developed as a power source, produced to meet specific aircraft requirements.

LINEAR AND ROTARY ACTUATORS

ELECTRO-MAGNETIC CLUTCHES



SPECIAL MOTORS

SCREW JACKS

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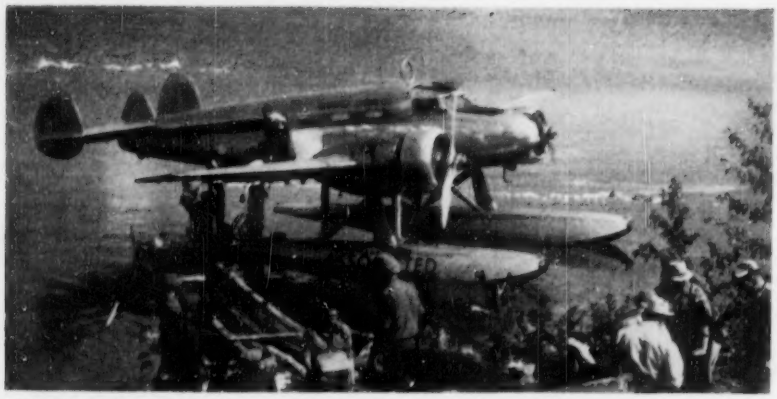

ASSOCIATED AIRWAYS operates Barkley-Grow into "wilderness seaport."

equipped with four-blade propellers to get slightly better takeoff and climb performance. Overseas versions of the plane, carrying 40 passengers, mount three-blade props, which give somewhat better cruise performance.

Trans-Canada's domestic DC-4M North Stars are giving 12.4 hours utilization per day. This figure takes into account all aircraft in overhaul, standbys, etc.

The carrier's cross-over exhaust program, to quiet the North Stars' noisy liquid-cooled Merlin engines, has been delayed by production difficulties (AVIATION WEEK May 12, 1952, p.72). Four planes have been equipped with cross-overs; the remainder is to be converted in the next few months.

TCA officials do not believe in domestic coach flights at the present time. They feel that low-fare flights would siphon off too many first-class passengers.

Canadian Pacific

Canadian Pacific Airlines, major privately owned competitor of Trans-Canada, suffered a hard blow when the first of its two Comet IAs crashed in India several months ago. The loss of the jet transport forced the carrier to postpone indefinitely its planned commercial jet operation between Australia and Honolulu. Loss of skilled flight and operations personnel left the airline a hard-to-fill gap in its roster. Promotion plans had been far advanced, and it was necessary to pull back much Comet material, from postcards to posters.

Best guess right now is that CPA will use its second Comet for route check, crew familiarization, sales promotion and advertising. The company has an option on four Comet 2s. They may be delivered in the summer of 1954.

CPA finds the DC-6B a highly efficient machine for its long-haul operation to the Orient. Route goes from Vancouver to Shemya, Tokyo, Hong Kong. Mechanical delays have been few and maintenance requirements reasonable, according to CPA engineers. They expect similar economical operation when the DC-6Bs' routes are extended to South America next September (AVIATION WEEK June 29, p. 18).

Canadian Pacific will soon take delivery of two Douglas DC-6As. Although the Canadian government recently refused the carrier's request for freight routes, airline spokesmen believe the routes will be forthcoming before too long. In any case, the carrier has an ace in the hole. The DC-6As can be converted to passenger-carrying aircraft if freight routes are not granted.

▶**New Service**—CPA recently inaugurated thrice-weekly Convair flights from Edmonton (Alberta) to Fairbanks, Alaska. This service provides new and direct service between Alaska and the East Coast through close connections with Northwest Airlines service to Minneapolis, Chicago, Detroit and New York.

Formerly, the only way to fly from Alaska to New York was to go through the Pacific Northwest. The Edmonton route cuts many miles off such a dog leg from Fairbanks. Eastern Canada may be reached by connections with Trans-Canada Air Lines, and a CPA Convair connects at Whitehorse, Yukon Territory, to tie Vancouver into the operation. The Edmonton-Fairbanks flight takes about eight hours and includes stops at Fort St. John and Whitehorse.

Queen Charlotte

Operating up the west coast from Vancouver to southern Alaska, Queen Charlotte Airlines has an "uncontrollable no-show problem." Many of its passengers are loggers. They make reservations but, say QCA officials, "they have a propensity for getting 'plastered' and forgetting all about the flight."

The airline is getting rid of its former

Computation

—from "Stars and Atoms HAVE NO SIZE" by A. M. SULLIVAN (by permission)

The Arab
who first wrote zero

And
the mathematic clue

To
nothing at all is a hero

Who
never got his due

Unless
he sought

To share
the eternal naught.

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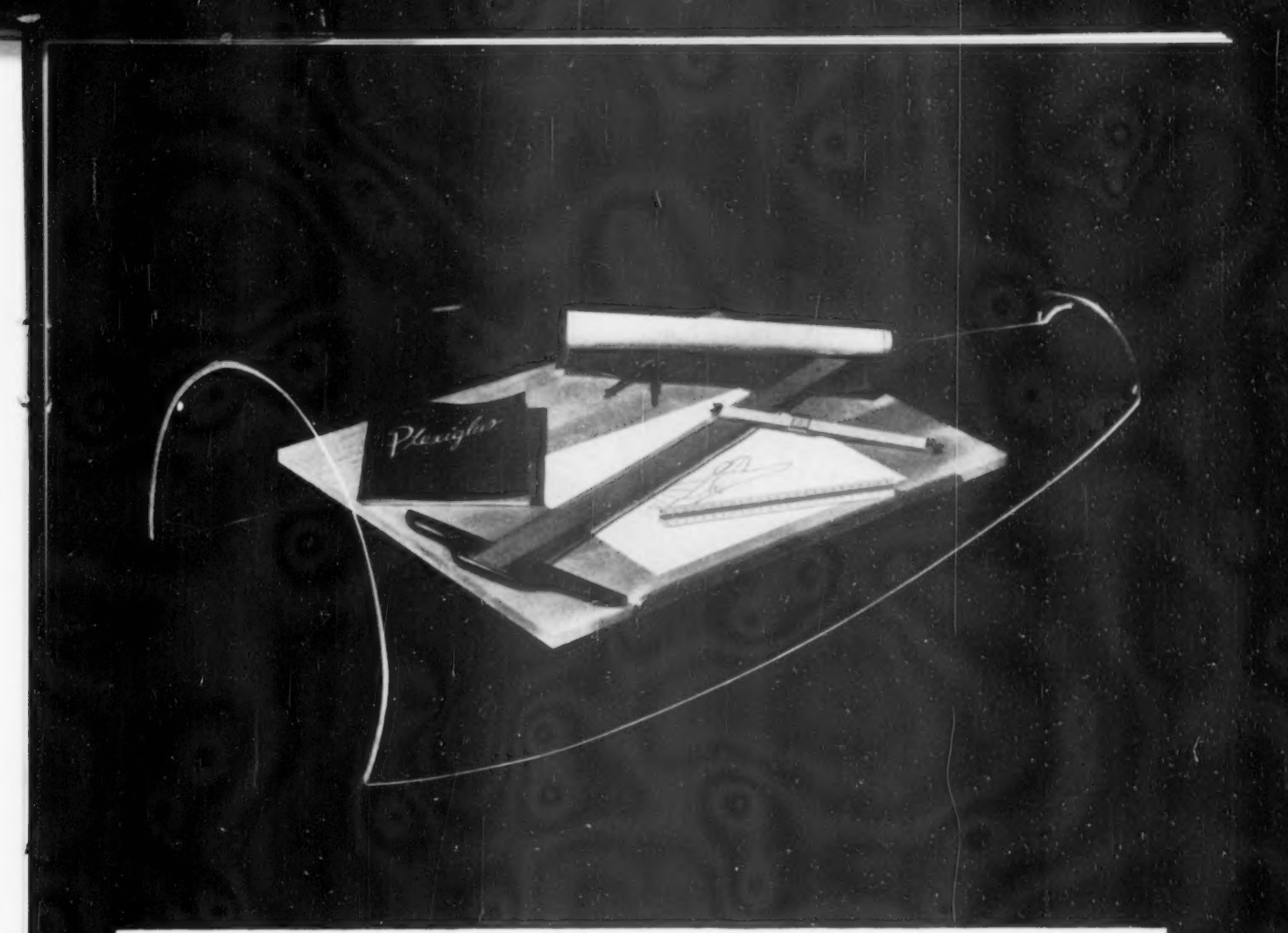

Behind the PLEXIGLAS . . . Proper Design

● The combination of properties in PLEXIGLAS acrylic plastic—clarity, strength, formability, resistance to weather—have made it a by-word for canopies, noses, astradomes and other transparent enclosures on all types of aircraft.

Of equal importance with these properties is the design skill of aircraft engineers who determine the shapes to be formed, and the type and thickness of PLEXIGLAS to be used. They must relate stress-distribution, attachment techniques, and maximum service requirements to the known capabilities of PLEXIGLAS and to the over-all design of a plane.

The proper design of enclosures demands full knowledge of PLEXIGLAS. Over the years, Rohm & Haas Company, in addition to manufacturing an aircraft glazing material with the optimum balance of properties, has worked closely with the aircraft industry and the armed services so that plane designers will have a thorough understanding of acrylic plastic and can use the material to best advantage.

The Rohm & Haas Company manual, "Handbook for Aircraft Engineers", provides detailed physical data on PLEXIGLAS and outlines recommended practices in the design of transparent aircraft parts. Engineers who do not already have the revised (1952) edition are invited to write for a copy.

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669·3 M.P.H.

BY THE SWIFT

London-Paris

JULY 5th, 1953

212·5 MILES

TIME: 19 MINUTES 5·6 SECONDS

SPEED: 669·3 M.P.H.

(Subject to Confirmation)

PILOT: M. LITHGOW

VICKERS-ARMSTRONGS LIMITED

London-Brussels

JULY 10th, 1952

200·38 MILES

TIME: 18 MINUTES 3·3 SECONDS

SPEED: 665·9 M.P.H.

(Confirmed by F.A.I.)

PILOT: D. MORGAN

SUPERMARINE WORKS · ENGLAND

assortment of small single- and twin-engine craft and is standardizing on planes such as the DC-3 and Noorduyn Norseman. It is also revamping its route structure from a semibush, feeder operation to trunkline flying, with Vancouver as the terminus.

QCA uses Consolidated Cansos for over-water and amphibious operations.

Pacific Western

Competitor of Queen Charlotte Airlines is Pacific Western. Headed by an old-time bush pilot, Russ Baker, the carrier was born in June when Central British Columbia Airways bought the licenses and facilities, but not the equipment, of these organizations: Associated Air Taxi and Associated Aero Services, both of Vancouver, and Port Alberni Airways, Port Alberni.

Pacific Western Airlines is a lusty infant. It operates 23 aircraft, principally into the north country of Kemano and Kitimat, where the Aluminum Company of Canada has begun building an immense, $500-million powerhouse and aluminum smelting plant. Other PWA operations take in such areas as Jervis Inlet, Gun Lake and Vancouver Island.

Okanagan Helicopters

Carl Agar, another bush oldtimer, started an almost incredible helicopter operation at Alcan's Kemano powerhouse site. Here helicopters—Bell 47Ds and Sikorsky S-55s—skitter up and down alongside 5,000-ft. mountains, hauling men and equipment in an out-size operation resembling the merger of a freight elevator and a large trucking outfit.

The rugged terrain makes ground transportation virtually impossible, especially in the winter when 60-80-ft.-deep snow drifts are not uncommon. The "eggbeaters," flying as many as 70 trips a day, scurry from base at Camp #8 to 16x20-ft. rectangular wooden platforms perched on the edges of precipices with a nonchalance born of careful advance planning and skillful execution.

Frigid winter climate and hot, high-altitude summer operation have posed stringent problems to the pilots and maintenance mechanics of this fairytale-like exploit, but the machines are kept in the air and turn in excellent utilization records.

Associated Airways

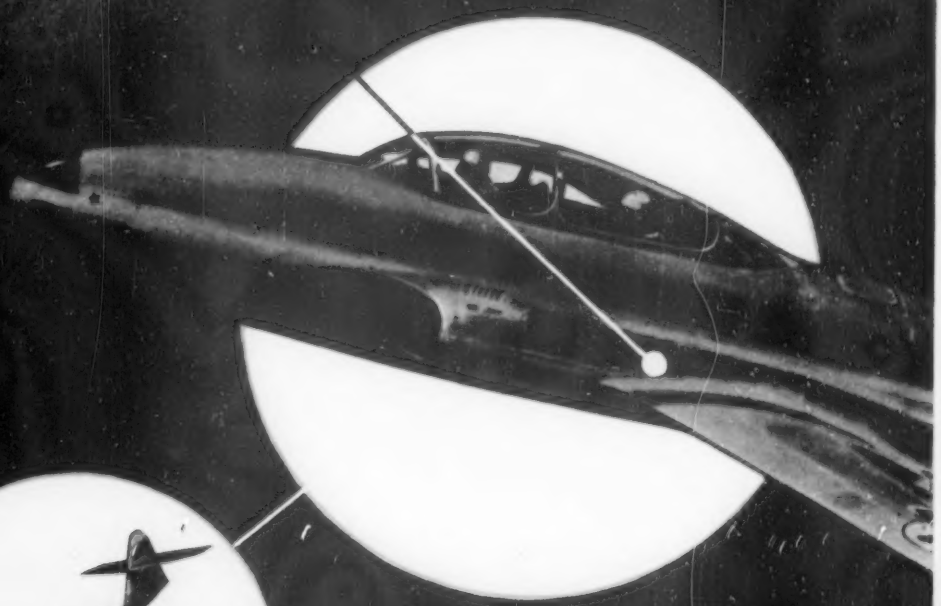
Operating out of Edmonton, Alberta, Associated Airways flies such diversified aircraft as Barkley-Grows, Bell helicopters and one Bristol Freighter.

A typical bush operation, AA sup-

Twigg — keynote to dependability

coordinating the skills of

fabricating experts



Twigg means precision and skill in the fabrication of components and assemblies for jet aircraft: combustion chambers • transition liners • turbine casings • tail cones • burner supports • brackets • all type spinnings • tube bending • other essential components.

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Just child's play? Yes . . but an interest is being born. First thoughts of flying came to the Wright brothers from a toy that was powered by rubber bands. From their boyish hands, the toy sailed through the air, and as it soared, their thoughts did, too. Today, faith in the sky comes naturally to American youth. It comes naturally to Ostuco, too. Though we are a pioneer in the development of steel tubing, we still have a youthful enthusiasm for new problems and new requirements. As a supplier to more than twenty leading American aircraft manufacturers, we have our sights set high. Our faith, too, is in the sky.

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plies gold mines, maintains forestry patrols to spot fires, runs oil surveys and does topographical flying for the Canadian government.

Associated's boss is an old-time bush pilot, Tommy Fox. Fox started his aviation career in 1930 by building a Pietenpol high wing monoplane from plans in a popular mechanics magazine and teaching himself how to fly the machine with the aid of an instructor who had racked up a total of 30 hours flying himself.

Recently Associated took over half interest in Aero Engineering, Ltd., a repair and overhaul depot at Edmonton Airport. Fox became the Aero Engineering's secretary-treasurer.

AA has high praise for the carrying capacity and ruggedness of its Bristol —ideal for the rough country it must fly in.

Bush Flying

The bush pilot is going to be around for a long time to come, according to Canadian aviation circles. Populations up North are, and probably will remain, too thin to support regular, scheduled service. The rough, heavily wooded, lake-splotched terrain discourages railroad and highway building, as do the freezing winters. So about all that is left is the versatile bush pilot and his maneuverable plane which can squeeze into the small lakes and smaller landing strips of the Northwest Territory and Yukon.

Probably the most impressive single feature of the bush operation is its very low accident record despite lack of radio facilities, atrocious weather, difficult takeoff and landing spots and almost entirely outdoor maintenance operations.

KLM Calls Jet Liner Flight Costs Too High

KLM Royal Dutch Airlines hasn't purchased jet liners because they cost too much to operate, says J. Algera, Minister of Transport for The Netherlands.

In addition, ground organization on routes flown by KLM does not meet the special requirements of jet transports.

Algera claims the high initial cost is not a factor in question.

But the Dutch are not ruling out jets completely, the minister says, because there is much to be said for the speed and passenger comfort of jet liners.

As soon as turbine transports become economical to operate, The Netherlands airline will not be far behind other international air carriers, Algera forecasts.

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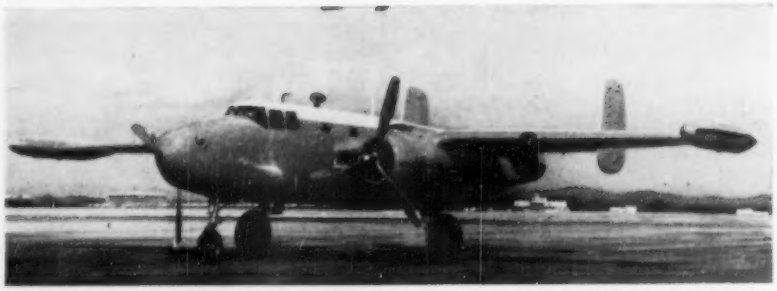

WINGTIP FUEL TANKS give executive B-25 a range of approximately 3,500 miles.

B-25 Tiptanks Give Double Value

Custom-modified wingtip tanks fitted to a transport version of the North American B-25 Mitchell bomber not only provide an executive customer with the longer range he sought but have also markedly improved its flying characteristics.

The installation was ordered by the B-25's owner, Schlumberger Well Surveying Corp., Houston, Tex., which wanted the plane's range raised to more than 3,000 miles without putting fuel tanks in the 13-seat cabin.

The problem was worked out by Aircraft Conversion Engineering Corp., Glendale, Calif., which designed the tiptank configuration and supervised the modification, performed by Long Beach Aeromotive, Long Beach Municipal Airport, Calif. It is believed to be the first such installation on a B-25.

MODIFIED tiptank holds 197 gal. fuel.

Long Beach Aeromotive modified a pair of Pastushin 230-gal. jettisonable military-type fuel tanks to hold 197 gal. each.

The B-25's wings were strengthened to take landing loads and down bending, since the customer had specified that the design must provide sufficient structural strength to permit landing with full tiptanks. The tanks are attached to the wingtip centerlines by three close-tolerance bolts and the joint planned so the tanks can be removed on the ground without further rework.

► **Stability Improved**—An exhaustive test program, including flights in turbulent air, was carried out with tiptanks installed. There was noticeable improvement in lateral stability and a marked increase in aileron effectiveness, especially at low speeds. No torsional movement relative to wing and tanks was observed during the tests.

Since the external wing tanks are located near the plane's center of gravity, there is little effect upon CG travel as fuel is used, and therefore minimum amount of trim correction is required, Pastushin says.

The Schlumberger B-25 consumes 110 gal. of fuel per hour and cruises at 230 mph. at 55% throttle. Landing speed is 90 mph. with flaps down. With 1,733 gal. of fuel, range is 3,625 mi. without reserve.

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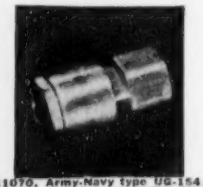
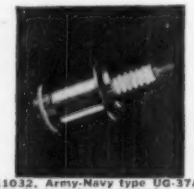
AI-11030, type BNC resistive termination plug. Weatherproof. Styrene Copolymer insert. Neoprene rubber gasket. Can be furnished with any desired impedance.

AI-11072, Army-Navy type UG-21D/U, improved type N plug for use with RG-8, 9, 9A, 10/U cables. Weatherproof. Teflon insert, neoprene mating seal gasket, silicon rubber cable clamp gasket.



AI-11070, Army-Navy type UG-154/U, type LC plug for use with RG-17, 18/U cables. Weatherproof. Silicon rubber gaskets.



AI-11032, Army-Navy type UG-37A/U, high voltage pulse receptacle pressurized. Ceramic insert, neoprene rubber gaskets.

AI-11022, special type BNC high voltage plug. Mates only with high voltage receptacles and jacks, for use with RG-59/U cable. Weatherproof, Teflon insert, Neoprene rubber gaskets.

AI-11006, Army-Navy type UG-355/U Klystron Coupler. Weatherproof. Styrene Copolymer and linen base bakelite inserts. For use with klystron tube 726C.

AI-11030, Army-Navy type UG-306/U, type BNC right angle adapter. One male, one female end. Weatherproof, Teflon inserts. Neoprene rubber gasket.

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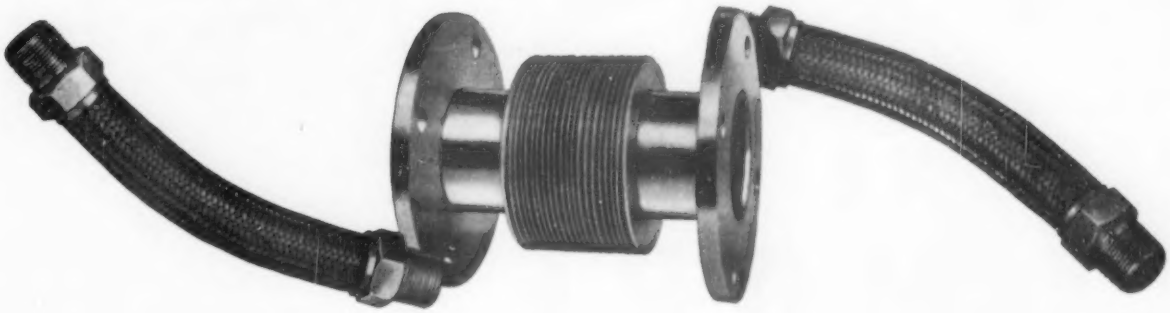

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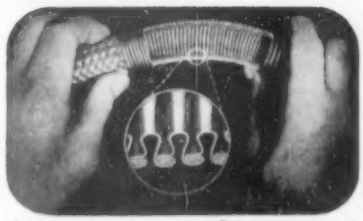
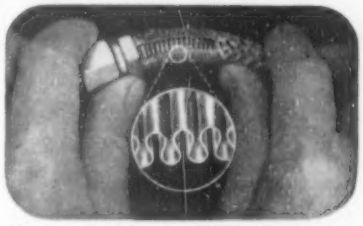
Get the facts without obligation

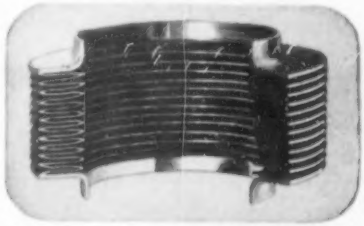
TITEFLEX literature contains full descriptions, technical data and suggestions for use. And Titeflex Designers and Engineers have a thorough knowledge of these products' behavior under exacting service conditions. Check the products that interest you and mail the coupon today. We'll be glad to help you with any specific problem.



Sectional view shows rugged, flexible, seamed construction of Titeflex.



Note the helically-corrugated, seamless wall structure of Uniflex.



Cross-section shows the welded, convoluted-diaphragm construction of Titeflex Bellows.

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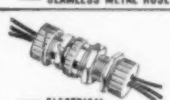

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WE NEED MORE ENGINEERS

NEWSWEEK
June 15, 1953

"The Navy has the Regulus, a descendant of the German V-1. Resembling a swept-wing jet fighter, it is about 30 feet long, has a jet engine, and has been flown at subsonic and supersonic speeds. Its stubby wings fold for storage – and the submarine Tunny has been converted so that it will soon carry two Regulus missiles. Many of the world's most strategic targets are within a few hundred miles of the sea, and the Regulus has that range."

Vought Fighter Wins Navy Competition

Chance Vought Aircraft won Navy's day fighter competition with a variable-incidence-wing-design plane powered by a Pratt & Whitney J57 with afterburner.

Chance Vought won the day fighter competition over seven other aircraft manufacturers including Temco, North American, Douglas, Northrop and McDonnell.

First flight of the new fighter production model is expected by the end of 1956, provided Navy orders the design soon.

AVIATION WEEK, June 1, 1953

Greater Opportunities for Engineers In Chance Vought's Expansion...

Recently, as Chance Vought Aircraft completed its thirty-sixth year designing and building military aircraft, the United States Navy announced that the company had been declared the winner of the Navy's day fighter design competition. The award for the design of this new aircraft was added to the current engineering programs for the Chance Vought Missile, Regulus, the F7u-3 "Cutlass" and the attack airplane, the A2U-1.

The design program for this new variable-incidence-wing fighter powered by a Pratt and Whitney J57 with afterburner, plus the increased emphasis on the engineering programs for the guided missile, Regulus, now offers excellent employment opportunities to many types of engineers and scientists. Vacancies exist at all levels and applicants with an engineering degree, but with no previous training or experience in the aircraft industry, may qualify.

If you are interested in further consideration for employment with this prime contractor **CONTACT US TODAY!**

Applicants will find employment available in the following types of work:

Aerodynamics	**Stress Analysis**	**Aerophysics**	**Technical Writing**
Airframe Design	**Aeroelastics**	**Guidance**	**Technical Illustration**
Mechanical Design	**Electronics**	**Telemetering**	**Mathematics**
Electrical Design	**Communications**	**Structures Test**	**Machine Computations**

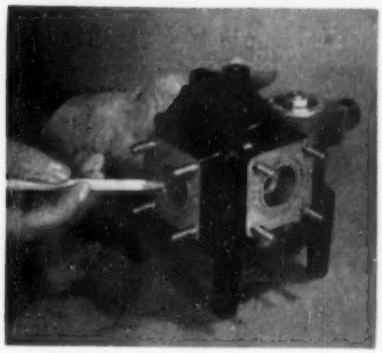
Company benefits include insurance programs, cost-of-living payments, premium pay for overtime and a retirement income plan. Liberal moving allowances provided. For further consideration for these positions submit a resume or letter of application to the Engineering Personnel Section, Chance Vought Aircraft, P. O. Box 5907, Dallas, Texas.

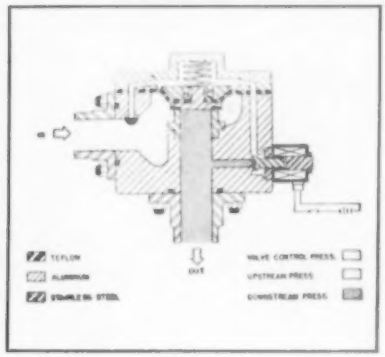
CHANCE VOUGHT AIRCRAFT

DALLAS, TEXAS

DIVISION OF UNITED AIRCRAFT CORPORATION

NEW AVIATION PRODUCTS





New Valve Controls Fuel In Afterburners, Rockets

Development of an improved fuel shut-off valve to control flow to turbojet afterburners and rocket fuel feed systems has been announced by Manning, Maxwell & Moore.

The unit is said to be smaller, simpler and inherently more reliable than types currently used. It uses no motor, but is actuated by the fuel flow itself, in conjunction with a solenoid which opens or closes one of the valve control passages in the device.

The valve can be made fail-safe in the shut or open position, depending on the application. No sliding pistons or other components that might become inoperative in the presence of foreign matter are used, the company says. The valve has a single poppet fastened to a flexible Teflon diaphragm on which fuel pressure acts to open or close the main flow circuit. Design of the unit is such that pressure drop is held at a minimum, the company claims. As it has no close-fitting parts, it can accommodate unfiltered fuel acceptable to the pump located upstream.

Fuel at pump pressure, bled into a chamber above the diaphragm, exerts a downward pressure on the poppet-diaphragm assembly to keep the valve closed against main inlet pressure. An outlet bleed passage connects the chamber to the downstream (outlet) side of the diaphragm. To keep shut-off pressure in the chamber, this passage is blocked by a solenoid valve. Energizing the solenoid opens the passage to the outlet side and drops the pressure in the diaphragm chamber, causing the poppet to open and allow flow through the main fuel circuit. Inlet fuel pressure continues to hold the valve member open.

The unit is constructed of an aluminum alloy valve body, stainless steel valve members and Teflon diaphragm and seals which are unaffected by aromatics and are non-corrosive when contacted by most rocket fuels. Integral legs on the valve permit mounting it to structure with adequate space for attaching pipe fittings.

Maximum rated flow of the model shown (weight, 3½ lb.) is 12,000 lb./hr. with a 15-psi. pressure drop through the valve. Opening and closing times are one second. The valve measures 4⅝ x 6⅛ x 5⅛ in.

Manning, Maxwell & Moore, Inc., Stratford, Conn.

Cheaper Process Seen To Make Avgas Elements

Use of the Houdry dehydrogenation process to ease the shortage of certain scarce elements used in aviation gasoline and synthetic rubber has been proposed by Houdry Process Corp.

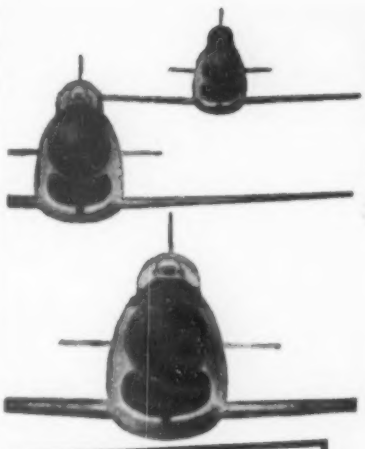
The firm has announced general availability of its method, which is said to be capable of producing the scarce elements from low-cost raw materials. An important application is conversion of butane to butylenes and butadiene. Butylene feedstocks are reported to be in short supply. Increased competition between avgas and synthetic rubber producers, resulting from government decontrols and rising demands, are reasons given for the shortage.

Houdry says its process can get around this obstacle by converting large available stocks of butane into butylene. The company produced butadiene by the process during World War II.

Houdry Process Corp., 1528 Walnut St., Philadelphia 2, Pa.

Revolving Head Sprays De-Icing Fluid Jets

A de-icing system that directs high-pressure jets of air and non-freezing liquid on the surfaces of wing leading edges and windshields to remove heavy ice has been submitted to the Air Force



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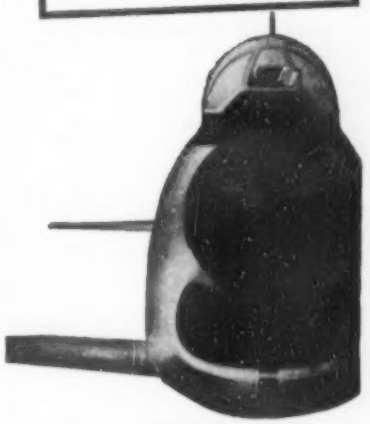

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How Alternator *BURN-OUTS* can be *Eliminated* with New Alarm System

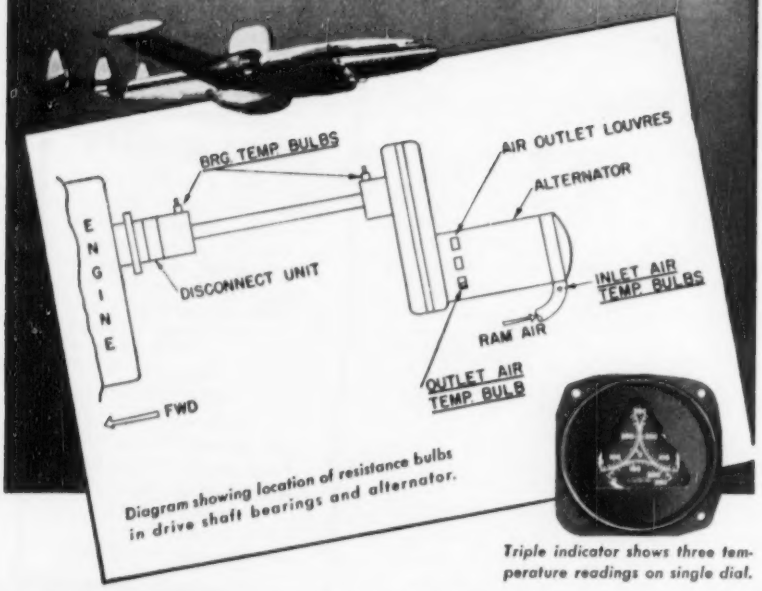

Diagram showing location of resistance bulbs in drive shaft bearings and alternator.

Triple indicator shows three temperature readings on single dial.

Lockheed and Edison engineers jointly developed this new Temperature Alarm System to eliminate burn-outs and bearing failures in the high speed alternator drive system of the RC-121C and WV-2 aircraft. After alarm the entire alternator drive system can be immediately disconnected.

This new Alarm System utilizes the same type of EDISON components which already have given years of dependable service in aircraft throughout the world. Standard tip-sensitive electrical resistance bulbs are placed in the drive shaft and gear box bearings to detect an early temperature rise which might lead to a bearing failure. The sensitive part of the bulb penetrates the housing and actually bears directly against the bearing race so that the slightest temperature increase is felt immediately and indicated on the left and right-hand scales respectively of the triple panel indicator.

Because of critical space limitations in the alternator itself it was decided to measure the differential temperature across the inlet and outlet air passages. Two bulbs in the inlet air duct are compared to a single bulb in the outlet air louvres and the differential temperature is indicated on the bottom scale of the panel indicator. The primary purpose of this arrangement is to detect a temperature rise due to mechanical failure with the added advantage of detecting electrical overloads. This added safety feature presents the possibility of preventing complete shut-down by reducing the alternator load.

An integral automatic alarm circuit completes the system so that the crew is alerted by visual warning well in advance of any danger from critical temperatures.

Thomas A Edison
INCORPORATED
Instrument Division
Dept. 49, West Orange, New Jersey

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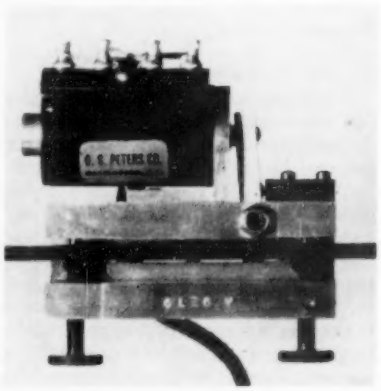
for testing by Patterson Products, Detroit, the company says.

The system also may be used for removal of rain water by using air jets alone. Patterson indicated that Air Force is at least as interested in this feature as in the de-icing angle.

The jets are disposed at intervals along the forward edges of windshields and wing leading edges. In one test on ice ranging in thickness from $\frac{1}{2}$ to $\frac{3}{4}$ in. at temperatures down to −20F, the de-icer reportedly removed $\frac{1}{4}$ in. ice in four seconds.

A typical installation uses a revolving circular head with six orifices spraying de-icing liquid at the windshield. The head revolves at 108 rpm. and the high velocity liquid hits the surface 648 times each minute. The unit for this installation weighs 5 lb., exclusive of the compressor.

Patterson Products, 518 Maccabees Bldg., Detroit 2, Mich.



Extensometer Tells Strength Of Stainless Steel Samples

An extensometer, particularly adapted for use on hard stainless steel tensile test specimens, according to the maker, can be used on $\frac{1}{2}$-in-wide material .005 to 0.25-in. thick. Using suitable recording equipment, magnifications of 250, 500 and 1,000 are available.

The device, designated Model P-101M, consists of a pair of Dural channel sections, each supporting one of the two clamping contact points at opposite ends of the 2-in. gage length. The hard points are on the end of thumb screws which clamp the specimen against flat anvils. Specimens do not have to be prick-punched.

Coil and core of the device are supported so that relative movement of sections changes position of the core in the coil. Electrical connections between extensometer and recorder are made by a flexible cord attached to the former device and terminating in a polarized plug that fits the recorder receptacle.

Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa.

Aircraft Dividends—Past and Future

On a Per-Common-Share Basis—Cash Payments Only

Company	Calendar Years 1953[2]	1952	1951	1950	1949
Beech	$1.20	$1.05	$0.80	$0.80	$0.55
Bell	1.75	1.50	1.13	0.88	0.50
Bendix	3.75	3.75	3.00	5.00	3.50
Boeing	4.00	2.67	2.00	2.00	1.33
Cessna	0.60	0.50	0.40	0.20	0.25
Convair	1.80	1.75[3]	1.40	1.00[3]	None
Curtiss-Wright	0.60	0.60	1.00	1.00	1.00
Douglas	5.75	3.75	3.50	3.13	4.63
Fairchild Engine	0.60	0.60	0.40	0.60	0.35
Grumman	2.00	2.00	2.00	2.00	1.00
Lockheed	1.50	1.20[3]	1.10	1.50	1.00
Martin	None	None	None	None	None
McDonnell	1.00	1.00	1.00	1.00	None
North American	1.50	1.50	1.25	1.25	1.25
Northrop	1.00	1.00[3]	None	None	0.23
Republic	1.75	1.25[3]	1.00	0.50	None
Ryan	0.50	0.50	0.40	0.20	0.10
Sperry	3.00	2.00	2.00	2.00	2.00
United Aircraft	2.75	2.00	2.00	1.67	1.67

[1] Adjusted for all stock splits.
[2] Author's minimum estimates.
[3] Plus stock dividends.
[4] Plus other assets distributions.

Aircraft Dividend Trend: Rising

Financial strength of industry is emphasized by higher stock payment and $1.50 bonus declared by Douglas.

The aircraft industry's trend toward higher cash disbursements to stockholders has been accentuated by an increased quarterly dividend and an extra declared by Douglas Aircraft Co.

The company boosted its previous rate of 75 cents per share to a quarterly dividend of $1.00 and declared an extra of $1.50 per share, both payable Aug. 19 to holders of record July 29.

Management gave no assurance that this increased quarterly rate would be maintained but said "consideration will be given at the October board meeting to an additional extra dividend at the end of the fiscal year."

► **Accelerated Sales**—The liberal Douglas dividend declarations followed on the heels of "excellent earnings for the six months ended May 31." During this period the company reported net sales of $458.8 million and net income of $10 million or $8.36 per share.

Net sales for the first half of the preceding fiscal year totaled $196 million, and net income was $4.38 million or $3.65 per share was realized.

While Douglas cautioned that earnings for the first half of the year necessarily cannot be projected over the entire 12-month period, completely absent from the current report is the explanation that accompanied a release of results for the first quarter earlier this year. Sales for that quarter were accelerated through a change in one of Douglas' larger contracts, resulting in an addition of some $43.8 million to sales for the period (AVIATION WEEK June 1, 1953, p. 73).

► **Investment Enthusiasm**—This large element of added sales and attendant earnings obviously is included in the current six months figures.

It is only natural to assume further that sales and earnings also were accelerated during the company's second quarter.

In other words, Douglas has elected to show higher sales and earnings during the earlier phases of its military contract work rather than wait for completion of these commitments.

This policy and the nature of statements accompanying the recent dividend declarations may serve to create a more enthusiastic reception in investment circles for the company's capital stock. And this should not be distasteful to Douglas officials holding options on 60,000 shares granted in 1951 and now fully effective.

► **Higher Dividends**—The fact remains that the Douglas dividend payments this year will be substantially higher than last year when a total of $3.75 per share was paid. Thus far in 1953, $4.00 per share has been paid or declared.

Our own estimate would be for an additional extra of at least 75 cents per share with the newly established $1.00 quarterly rate, making a projected total of $5.75 for 1953.

► **Industry Boosts**—The Douglas action should not be allowed to obscure the fine earnings reports of other aircraft builders and their support of increased dividend payments. Boosts in quarterly or semi-annual disbursements already have been declared by a number of companies. United Aircraft Corp. was on an indicated 50-cent quarterly rate, increased its most recent periodic payment to 75 cents per share.

The impact of larger dividend disbursements, however, is likely to be reflected in a series of extra yearend payments for many of the aircraft companies.

With operations for the full year virtually completed at that point, managements can best evaluate their earnings picture, financial requirements and outlook and measure disbursements to stockholders accordingly.

► **Stable Equities**—As first indicated by AVIATION WEEK nearly two years ago (Sept. 10, 1951, p. 60), greater stability in regular dividend payments was becoming an important investment characteristic of aircraft equities.

This trend continues and increased dividend disbursements, affording even more attractive income yields, should serve to further enhance the investment position of the group.

In view of many imponderables in aircraft production sales and earnings, no firm projection of dividend payments can be advanced. Nevertheless, in view of existing earning trends for the industry, an attempt is made to estimate total minimum aircraft dividend payments for the separate companies for 1953. This is done in the accompanying table with actual payments for the four preceding years to 1949.

Should these estimates of total dividend payments be realized, it will be found that, at present market quotations, many of the aircraft equities show an income yield ranging from 7% to approximately 10%, a very liberal return.

► **Future Earnings**—An important qualification prevailing among investors, however, is how long in the future will sustained high earnings continue and thus support the present level of dividend payments.

Cutbacks in order backlogs already imposed and apprehension as to additional stretchouts in production are discouraging to many wouldbe investors.

A realistic approach would conclude that a strong aircraft industry is essentail to the national defense of the country. For this reason, selectivity among the various aircraft builders is more important now than at any time in the past.—**Selig Altschul**

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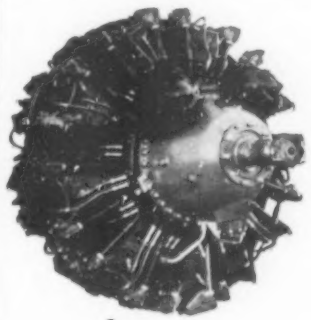

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Russian Civil Air Transport Trails West's

- **Reds fly twin-engine, 27-32 passenger planes on most routes, reserve modern aircraft for officials.**
- **Soviet airline makes little progress in past three years, gets equipment the military forces do not need.**

(McGraw-Hill World News)

Russia's civil air transportation is continuing to trail Western standards both in service and equipment.

This conclusion is not based on so-called "reliable sources" which allegedly have contacts behind the Iron Curtain. Rather, it stems from the tacit admissions of the Russians themselves.

▶ **Il-12 Backbone**—Most significant evidence of the Russian airlines' slow progress is their almost universal reliance on the twin-engine, 27-32-passenger Il-12 transport which was first introduced in 1948. The four-engine, 66-passenger Il-18, which came out about the same time as the Il-12, remains conspicuous by its absence from scheduled service.

Latest advertisements in Soviet publications by Aeroflot (Russia's civil airline monopoly) show the Il-12 featured prominently against the background of a map of the U.S.S.R. Most recent Soviet pictures of airports and terminals show flocks of Il-12s but not a four-engine transport in sight.

(A Canadian newspaperman who recently flew Russia s civil airline from Paris to Peking and return with stops at Irkutsk, Novosibirsk, Krasnovarsk, Omsk, Sverdlovsk, Kazan, Moscow, Minsk, Warsaw and Prague, saw only one four-engine transport on the entire trip. All of the intermediate cities named are main points on Aeroflot's routes.)

This does not imply that Aeroflot has no four-engine equipment. Instead it indicates that with Russian air transport largely limited to persons on official business, there still is not a sufficiently great continuing demand for space to justify regular schedules with large equipment on most routes.

Despite claims of greatly expanded airline service made recently by Pravda in announcing the new spring and summer Aeroflot schedules, there are few significant changes from previous years. Indications are that most of the increased service represents the normal resumption of flights that are discontinued in Russia during the winter.

Most important disclosure was that the spring flight frequency between Moscow and Vladivostok is still only one trip daily. While doubling the service offered over the route during the past winter, the 1953 spring schedule is exactly the same as in the summer of 1950, when a daily flight was inaugurated on the transcontinental Moscow-Vladivostok run.

▶ **Pravda Report**—Nevertheless, Pravda insisted that "significant" increases in flight frequencies had been placed in effect on all existing routes as well as on several new links.

The paper said additional flights are operating between Moscow and the three eastern Siberian cities of Khabarovsk, Irkutsk and Chita; and between Moscow and the Ural industrial centers of Sverdlovsk, Chelyabinsk and Molotov. Two flights daily are now offered between Moscow and Krasnoyarsk, an important commercial center in central Siberia.

Largest increases in spring service—following the pattern of other years—are between Moscow and the Black Sea resorts. Frequencies are as high as three flights daily between Moscow and Simferopol in the Crimea. Direct flights from Leningrad, Tashkent, Alma-Ata, Stalinabad, Kuibyshev and Sverdlovsk to the southern health resorts also are provided.

New passenger routes reported opened include Moscow-Leningrad-Murmansk and Leningrad-Chelyabinsk.

No direct criticism of Russian airline service has appeared in the Soviet press, which during recent months has sternly pointed out defects in other branches of the nation's economy. However, there are indications that operations are not perfect.

A pilot, I. Chugunov, recently complained in a letter to the official Soviet government newspaper Izvestia that he sent two letters from Moscow to Kazan, one by ordinary mail and one by airmail. Both took six days to travel the 500 miles. Chugunov suggested that the Ministry of Communications ought to give serious attention to the airmail situation.

▶ **Subordinate to Military**—With the Russian civilian economy rigidly subordinated to the military buildup, shortcomings of the Soviet civil airline system do not reflect on the caliber of the Red air force. Aeroflot is given what the air force, army and navy do not need.

Indicative of the close link between Russia's military aviation and the nation's other air activity is provided by the increased attention given by the Soviet Union to its government-subsidized, militarily directed aviation "sports" activities.

NO FOUR-ENGINE transports are seen in this photograph of Moscow airport.

POSTERS feature twin-engine transports.

DC-3 Successor Prospects Dim

House closes door on government aid in developing new local service transports, jet liner prototypes.

All doors remain closed that local service air lines have knocked on in search of assistance in the development of an economical airplane to put their operations on a sound financial basis, testimony before a House commerce subcommittee hearing shows.

Testimony disclosed:

• **No interest** has been generated among U. S. manufacturers to build a replacement for the 17-year-old DC-3, which accounts for 117 of the combined 130-plane fleet of local lines.

• **Canadair, Ltd.,** has decided not to go forward with production of its CL-21 unless there are purchase agreements for the delivery of 80 to 100 planes. The local service lines cannot finance such an order.

• **Administration support** for government financial aid in the development of a local service plane has dwindled to shaky backing by one agency—Civil Aeronautics Board. But the Board may have to back-track on its position, presented without Budget Bureau clearance to show it was in accord with the President's program. It seems unlikely that an airline-aid plan will fit into the Eisenhower economy program.

• **Civil Aeronautics Administration** is opposed to federal financing for development of a local service plane at this time, because the carriers, without permanent operating authority, would be unable to finance purchases.

CAA and CAB positions raise a "chicken and egg" question. The Board contends local lines must have an economic plane before their operations can be sound and warant authority. CAA argues that the project cannot be undertaken for a "temporary" market and that permanent operating authority must come first. So far, CAB has been giving five-year (and a few seven-year) renewal certificates to local lines.

▶ **Jet Prototype**—Meanwhile, the subcommittee chairman, Rep. Carl Hinshaw, said legislation providing for federal financing of jet transport prototypes would be deposited "in the ashcan."

Subcommittee witnesses unanimously agreed that, because of the improved financial position of both airlines and manufacturers, the industry could handle the development on its own.

Here are key points made by witnesses appearing before the subcommittee:

▶ **Local Service**—Former CAB Chairman Donald Nyrop, now counsel for the Conference of Local Airlines, faced up to the insurmountable opposition to legislation providing an outright $8-million federal outlay for development of a plane, urged instead enactment of a measure having these advantages:

• **Any experienced** and qualified aircraft manufacturer would be eligible for a government loan of 75% of the total estimated development cost of a local service plane, including a helicopter, with $8 million the maximum loan.

• **The loan** would be repaid to the government, and the obligation to repay the loan would be reduced only in the event that the manufacturer designed, placed into production, sold and delivered an economical transport to the local carriers. Amount of the write-off would be geared to the number of planes delivered.

• **Such a plan** would provide sufficient government financial support to encourage U. S. manufacturers to go forward with a local service project. At the same time, the government would not be underwriting development costs that did not result in the production of a new and more efficient plane, Nyrop said.

▶ **Mushroom Growth**—Local lines now serve 320 cities representing a population of more than 43 million, he reported, and provide the only air transportation available to more than 4 million persons in 283 small towns.

He gave this picture of the mushroom growth of local lines over the past five years and the prospect for continuing growth:

• **Total commercial revenues** and revenue passengers increased approximately four times between 1948 and 1952—from $5 million commercial revenue and 425,000 revenue passengers in 1948 to $20.6 million commercial revenue and more than 1.7 million revenue passengers in 1952.

• **Air express** and airfreight revenues increased 4.5 times.

• **Early reports** for the first quarter of 1953 indicate an increase over the first quarter of 1952 of 24.5% in revenue passengers, 19.7% in revenue ton-miles and 9.5% in revenue-miles flown.

"While we cannot reasonably expect this rapid rate of increase to continue indefinitely," Nyrop observed, "there are as yet no indications that the peak has been reached."

Mounting maintenance costs, he said, are making DC-3 operations increasingly uneconomical. Examples he cited: Cost of engine master rods has gone from $75 to $225; cost of engine cylinders, from $17.50 to $60.

▶ **CAA View**—CAA Administrator Fred Lee prodded Air Force and Navy to order "even a moderate number of jet transport aircraft," saying that "it would not only provide them with the latest and highest performance transport aircraft but would provide an invaluable stimulus to commercial jet aircraft production."

Although there is "an urgent and pressing need" for development of an up-to-date replacement for the DC-3, Lee said that because the local lines "are very seriously handicapped in their efforts to pay for new equipment because of their lack of permanent operating authority," it would be premature for the federal government to undertake

AIR FRANCE GETS TURBOPROP VISCOUNT

Flight photo of first of 12 Vickers Viscount turboprop transports ordered by Air France shows aircraft wearing the airline's insignia. The carrier will put the planes in tourist service on its European routes. The Air France Viscounts are designated Model 708.

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financing the development of a local service plane.

▶**ATA View**—Stuart Tipton, counsel for Air Transport Assn., observed that CAB, with its authority over airline profits, holds the key in determining whether the carriers will be able to finance the purchase of jets.

He estimated that airlines will want to acquire approximately 100 jets from 1955 to 1960 and said that the initial production cost on these aircraft may run as high as $4 million.

ATA vice president Milton Arnold told the subcommittee that the assumption that the British today have outstripped American development and captured the leadership in the market for jet transports "is not factual." Instead of being concerned, Arnold declared, "I think we should be very thankful and appreciative of the experimentation which has been done by the British and which, coupled with our own military development, has advanced by several years the acceptance of jets by U. S. air carriers."

CAB Chairman Oswald Ryan urged an $8-million federal outlay for development of a local service plane, stating that "it is not excessive when compared with the ultimate good its expenditure would probably produce."

El Al to Give C-46s Auxiliary Jet Pods

El Al Israel Airlines plans to install in each of its five C-46 auxiliary jet units that will allow a 10,000-lb. increase in the plane's takeoff weight. The carrier has completed the first prototype at its New York International Airport maintenance base.

The installation, similar to that made by the Flying Tigers and the Brazilian airline, Varig, consists of a pair of Turbomeca Marbore 2 jet engines, giving 880 lb. thrust each.

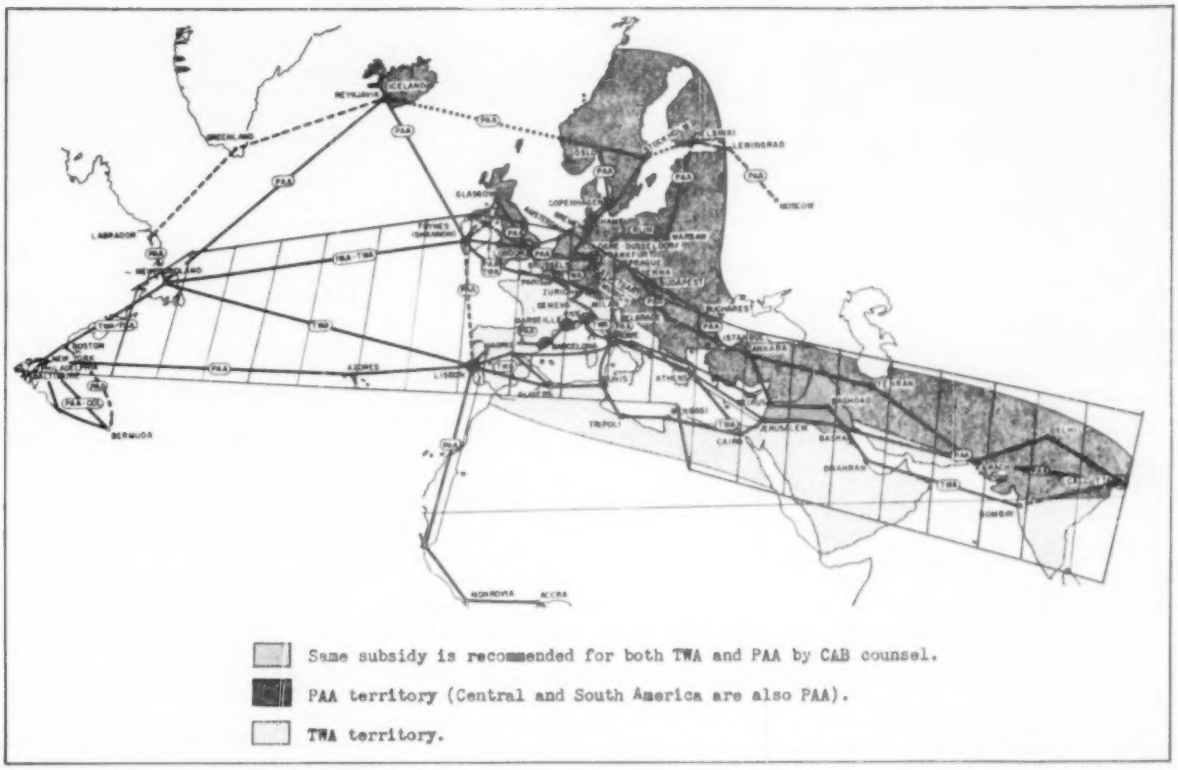
El Al says it will make the pods—adaptable to any type of aircraft—available to anyone that wants them. Cost of the streamlined units will be about $25,000. Dr. Erich Schatzki developed El Al's unit.

Ethiopian Airlines is said to be interested in the installation, and U.S. Air Force officials have visited El Al shops to examine the pods, the carrier reports.

France-Venzuela Pact Near

(McGraw-Hill World News)

Maiquetia, Venezuela—A bilateral air agreement will be signed soon by France and Venezuela, according to Eduardo Marturet, Venezuelan charge d'affairs in France. Marturet disclosed this news recently at the International Airport.


Same subsidy is recommended for both TWA and PAA by CAB counsel.
PAA territory (Central and South America are also PAA).
TWA territory.

TWA AND PAA compete on trans-Atlantic flights, fly parallel routes from Europe to the Near and Middle East. Dotted lines indicate routes that were inactive in 1952, including Pan American segments in the Soviet Union from Leningrad to Moscow.

Board to Put PAA, TWA on Their Own

- **Permanent subsidy rates expected this winter, giving airlines first chance since 1945 to run own business.**
- **Final mail pay would yield $4 million annual profit for Pan American, $2 million for Trans World.**

By Lee Moore

Trans World Airlines and Pan American World Airways this winter will get their first chance in eight years to run their own business.

Civil Aeronautics Board since 1945 has been doling out chunks of subsidy mail pay piecemeal to TWA International and PAA Atlantic. They could never know how much to count on.

Now the Board expects to set permanent rates for them this winter, effective retroactively to last Jan. 1. They will profit or lose henceforth by the manner in which they use their fixed subsidy allotment.

▶ **Profit Forecast**—Final rates will put the whole of TWA and PAA on their own, for a while at least, because their Atlantic Divisions are the last parts of the companies still on temporary rates.

The final rates proposed by the CAB staff are forecast to yield TWA International about $2 million annual profit, and the bigger PAA Atlantic about $4 million.

▶ **Profit for Common Stock**—In this case now before the Board examiner for initial decision, the CAB staff has proposed for the first time that the Board grant a "differentiated" return on investment. Instead of an overall 10% return on total debt and equity investment, staff would set the subsidy rate to cover the 3 to 3½% interest payments on the debt, then an 11 to 12% return on common stockholder's equity. Purpose of this plan is to influence the companies to stick with equity financing.

The old system of a straight return on total investment tends to favor heavy debt, because of the leverage it creates for the common stock.

▶ **Off Temporary Basis**—Atlantic operations have been on temporary, break-even mail rates since Dec. 31, 1945—with profits subject to recapture and losses not necessarily recoverable.

While this temporary rate system also appeared to give the airlines a cost-plus type of security, the companies could never be sure of it. Final decision on profits depended not on economic success but on government evaluation.

Proof of the uncertainty of this method is that CAB staff in fixing TWA's and PAA's back mail pay for the seven-year period 1946-52 now proposes to recapture $1.8 million from TWA and $1.3 million net from Pan American. Furthermore, the staff proposes to disallow about $10 million of past Pan American expenses.

▶ **Earnings Forecast**—The mail rates proposed by the CAB staff are estimated at $12.5 million annual mail pay for PAA and $7 million for TWA. They are lower subsidy rates than TWA and Pan American say they should get for their service performed under the Civil Aeronautics Act. However, since the closing of evidence in this case, TWA's revenues have exceeded the CAB forecast.

Pan American's picture may be gloomier, temporarily. The staff proposes a rate for Pan American's Atlantic-Central and South Europe-Middle East routes identical with TWA's, but Pan American's expenses have been higher. Staff also proposes to stop subsidizing

excess cost of operating the big Boeing Stratocruisers.

Pan American alleges that some of its routes in the area are weaker than TWA's, and PAA should get a higher rate. Regardless of how CAB finally rules, the advantage of the final rate should be that once it is set Pan American can tailor its service to fit the rate, if necessary.

The rates proposed would be identical for TWA and Pan American in the comparable area. They would yield PAA an estimated $8 million and TWA $7 million in that area. PAA would get another $4.5 million for its African and Northern Europe operation.

▶**Temporary Rate Record**—On temporary mail pay, Pan American Atlantic Division reported a loss of $1.2 million for 1950 and profits of $1.3 and $1.5 million respectively, in 1951 and 1952. TWA International Division earned $4.3 million in 1950, $4.7 million in 1951 and $0.3 million in 1952 (when temporary mail pay was cut heavily by CAB) before taxes.

Final retroactive pay proposed by the CAB staff for 1946-52 is slightly lower than the pay they got on various temporary rates. Counsel says TWA was overpaid a total of $1.8 million and Pan American and American Overseas Airlines (merged in 1950) were overpaid $1.3 million (Pan American overpaid $5.2 million and AOA underpaid $3.9 million).

▶**CAB Staff View**—In recommending mail pay, CAB always disallows certain expenses and investments as not proper for government subsidy, under the Civil Aeronautics Act. Then the Board decides how much money a company needs to meet the allowed expenses, and how much more it needs to realize a fair return on the allowed investment.

The CAB staff, represented by counsel for Bureau of Air Operations, says Pan American Atlantic Division spent more than $10 million that should not be subsidized for the period 1946-52. On TWA the staff goes easier, and in fact holds up TWA as the yardstick of what Pan American should have been able to do.

However, the staff disallows parts of TWA selling expense, top management salaries and a few other items that ran higher than the average for other airlines.

With Pan American, the staff first earmarks in detail about $3 million of allegedly excess expense 1946-52. Then Pan American's remaining costs are compared with TWA costs on routes adjudged "comparable," and Pan American is found to have spent another $7 million more than TWA, although CAB cannot put its finger on where the expenses were alleged to be uneconomical.

Here are highlights of CAB staff's appraisal of past and future subsidy need for TWA and Pan American.

▶**TWA Expenses:**

• **Selling.** CAB generally has urged a 19-20% maximum ratio of sales expense to commercial sales revenue. For retroactive pay on the Atlantic route, CAB staff recommends a 19.5% limit for PAA and 20% for TWA (the extra half point to TWA to offset PAA's competitive sales advantage with the double-deck Boeing Stratocruiser).

• **Pierson, Damon salaries.** Staff recommends no subsidy for salaries above $65,000. TWA board chairman Warren Lee Pierson got $70,540, $74,945 and $79,870 in the years 1950, 1951 and 1952 respectively. TWA president Ralph Damon got $89,850 in 1950 and $94,864 in 1951 and 1952. CAB staff says salaries of chief executives of American, Eastern and United averaged about $58,000.

• **Domestic expense.** CAB staff says TWA should not be allowed to reallocate $2.8 million joint operating expenses from its domestic to its international account, as proposed.

• **Strike losses.** Counsel says CAB cannot subsidize losses from employe strikes, that CAB cannot judge which party is "at fault" in a labor dispute. Also, says counsel, strikes are a risk common to all business, and are a part of the risk and capital cost of doing any business. Therefore, the normal return on investment must absorb the strike risk, counsel concludes.

▶**TWA Answers**—Some of TWA's major rebuttals to CAB staff recommendations:

• **Limit sales.** TWA's brief lashes out at bureau counsel's arbitrary rule that no airline should spend more than 20% of commercial revenue on selling expense. "The incentive provided by this type of rate-making is the incentive to push the right number of dollars into the right function account," TWA says. The company adds that "in 1952 its break-even need was 4 cents a ton-mile, compared with 12 cents for Pan American."

"The Board's staff has concluded that 10.35 cents a ton-mile is honest, economic and efficient for Pan American, but TWA should be cut to 2.13 cents," for 1952.

• **Differentiated return.** TWA contests the CAB staff's newly proposed system of "differentiated" return on investment—one rate to cover debt payments and another to cover common equity. TWA notes that this would yield a low overall return to a company with substantial debt.

TWA says that would discourage refinancing reduction of the debt ratio. CAB staff answers that if a company wants to refinance, it can ask a new mail rate to yield more return to take care of the expanded equity.

▶**PanAm vs. TWA Expenses**—CAB staff treats Pan American Atlantic Division in two parts—one area "comparable" to TWA, the other entirely separate.

Staff says CAB and the President purposely certificated TWA to compete with Pan American. They compete di-

Revenue vs. Expense

Degree of self-sufficiency of U. S. international airlines in 1952, as measured by their commercial (non-U. S. mail) revenues as a percentage of their total operating expense, is shown in following table:

TWA International	94%
Panagra	91
Chicago & Southern	91
Pan American-Alaska	86
Pan American-Atlantic	84
Northwest Orient	83
Pan American-Pacific	82
Pan American-Latin America	82
Braniff	67

Source: TWA brief to CAB examiner, July 3, 1953, on trans-Atlantic mail rate case.

AIR FRANCE'S TURBO COMPOUND SUPER CONNIE

First of 10 Air France Lockheed Super Constellations powered by Wright Turbo Compound engines is seen taking off on a flight test from Burbank, Calif. Planes can be fitted to carry up to 94 tourists on the trans-Atlantic run. The Super Connie's four engines deliver a total of 13,000 hp. Plane has 4,000-mi.-nonstop range.

rectly to Shannon, London, Paris, Frankfurt, Lisbon, Beirut, Baghdad and Calcutta. They also compete in solicitation of customers to fly their routings throughout much of the area judged comparable—Atlantic, British Isles, Central and Southern Europe, North Africa and Middle East.

Since TWA's costs are lower in that area, staff uses TWA as a yardstick with which to chop more than $7 million from Pan American's expenses 1946-52.

Pan American opposes this comparison on several points:

• **Different accounting.** But staff says accounting is similar.

• **More stations.** But staff says size of the operation should not increase cost. Pan American and some independent observers say that is ridiculous.

• **Lower traffic density.** But CAB staff says density of the routes is about the same.

• **More competition.** But staff says competition is similar.

• **No domestic U. S. routes.** But staff says TWA competitors, American, Eastern and United, tend to feed international business to Pan American rather than TWA.

• **Less foreign mail.** But staff says PAA has an equal chance for foreign mail business.

• **Lower fares.** But staff says that balancing fare discounts vs. anticipated volume they may create is a management choice, and if PAA chose to operate at a lower yield per unit of customer service and it did not pay off, that is PAA's problem.

▶ **Other PAA Disallowances**—Bureau counsel is critical of a number of details of past Pan American management. Among the expenses that he urges be disallowed in subsidy requests for the 1946-52 period are:

• **Stratocruiser cost.** CAB staff says purchase and operation of the B-377 was "an unfortunate experiment." Staff admits that prudent managements could have and did make the experiment, and that it has developed the state of the art to some extent. The past excess cost of Stratocruiser operation is therefore recommended for subsidy coverage.

But staff says the experiment "cannot continue indefinitely at the expense of the government." Therefore, staff urges that, starting last Jan. 1, CAB should refuse to subsidize unit costs above those of competitive Constellation and DC-6 types.

• **Bermuda 1951.** Excess costs should be disallowed, staff says.

• **Too much equipment.** Costs of PAA's alleged under-utilization of B-377 and L-049 planes in 1949-50 should be disallowed, staff says.

• **Overscheduling.** PAA operated excess capacity in 1949 and cut capacity uneconomically in 1952, first quarter, staff claims.

• **Deadheading.** CAB staff says the costs of ferrying planes between New York and Miami for high-frequency maintenance services and route changes should be disallowed.

• **Sales promotion.** PAA selling expenses were unreasonably high 1949-52, staff says.

• **All-cargo service.** Staff notes that CAB has refused to subsidize long-haul all-cargo service, largely on grounds that independent cargo airlines manage to survive without subsidy, and it would be improper to subsidize their competition.

• **Washington promotion.** Salaries of certain PAA Washington public relations men should be disallowed, staff recommends (AVIATION WEEK July 20, p. 12).

CAB ORDERS

(July 13-19)

GRANTED:

Panagra suspension of service at Corumba, Brazil, until the Brazilian government renews its permit there.

Consolidation in the New York-Chicago route case of applications by North American

- **Lightweight** – forged aluminum; no adapters needed
- **Compact** – minimum turn radii
- **Smooth Flow** – machined bore; minimum turbulence
- **One-piece Body** – leakproof, fatigue-resistant

Resistoflex flanged fittings have USAF and BuAER approval. Used with MIL-H-5511 hose for fuel, oil, coolant and hydraulic assemblies. Full data in Resistoflex Aircraft Catalog – send for your copy.

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CORPORATION
Belleville 9, N. J.

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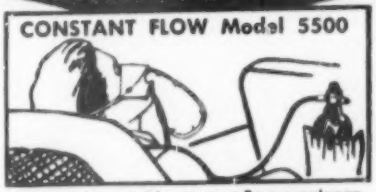
Portable Airline
OXYGEN UNITS

CONSTANT FLOW Model 5500



Lightweight portable constant-flow supplementary oxygen for passengers or crew. Used with disposable or conventional re-breather mask.

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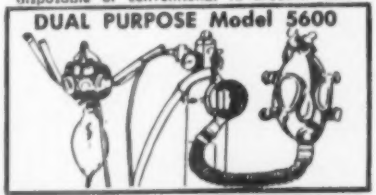

Lightweight portable oxygen equipment with demand and constant flow outlets. Demand for smoke and fume protection of crew; constant flow for supplementary or therapeutic use of passengers or crew. Write today for complete information on both models!

Also fixed systems for airlines and corporate aircraft.

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225 ERIE STREET LANCASTER, N. Y.
Export: Southern Oxygen Co.
157 Chambers Street, New York 7, N. Y.

"They've got all sizes in there"

Van Dusen
AIRCRAFT SUPPLIES
Every Aircraft Need from ONE Source

TETERBORO, N. J. MINNEAPOLIS, MINN. BOSTON, MASS.

Airlines (nonsked) and American Airlines. North American asks certification of New York-Chicago service via Philadelphia and via Pittsburgh, Cleveland, Detroit. American asks inclusion of a Philadelphia application with its other requests in the case.

Intervention in the New York-Chicago route case by Delta-C&S and Mohawk Airlines; the Postmaster General; Port of New York Authority; Cleveland and its chamber of commerce; Detroit and its board of commerce; Philadelphia and its chamber of commerce; Minneapolis-St. Paul Metropolitan Airport Commission, Spokane and its chamber of commerce.

Intervention in Braniff Airways local route renewal case (Route 106) by Northwest Orient and American Airlines; Postmaster General; Mason City, Ia.; Clinton, Ia., and its airport commission; Dubuque, Ia., and its chamber of commerce; Waterloo, Ia.; Sioux City chamber of commerce; Ft. Dodge, Ia., and its chamber of commerce.

Seaboard & Western Airlines permit for two flights from Brussels, Belgium and/or Munich, Germany, to New York July 14 and 21. Trans World Airlines wrote CAB July 13 that a navigator strike prevented TWA from providing such service.

APPROVED:

Interlocking directorship of Frank W. Hulse as president and director of Southern Airways (certificated local service line) and owner of Southern Airways Co. (fixed base operator). CAB specified that approval is contingent on "there being no future transactions" between airline and company. Hulse said he had tried to sell his stock in company but must await a suitable offer.

Interlocking directorships of Charles F. Cessna as secretary and director of Helicopter Air Service (scheduled copter service in Chicago) and directorships and positions with National Aero Service, National Aero Sales Corp. and Bohling Aircraft Corp.

Inter-airline contracts on airtrip insurance, reservations, joint ticket offices at military bases, etc.; CAB approved 15 agreements of the Air Traffic Conference of America.

Interlocking directorship of Ambrose J. Seitz as officer and director of Railway Express Agency and Union Pacific RR and affiliates.

DISMISSED:

Cargo-rate complaint of Society of American Florists against Braniff, Continental and Delta Air Lines. CAB said their minimum charges on cargo rates are no higher than those of other carriers.

TWA application to serve Detroit, Buffalo, Rochester and Syracuse. The airline withdrew its application, alleging that its studies indicate little traffic potential at Buffalo, Rochester and Syracuse.

DENIED:

Consolidation in New York-Chicago route case of Capital Airlines' application to serve Milwaukee between Chicago and Detroit. CAB said application was late and extended scope of case beyond New York-Chicago limits set by Board. Member Josh Lee dissented, saying CAB included Northwest's similar application and consolidated American and North American applications filed later than Capital's.

SHORTLINES

► **Air Coach Transport Assn.** reports members hauled 88,095 military passengers 132,142,500 passenger-miles on official contracts with Defense Department the first half of this year, plus another 20,135 military personnel traveling at their own expense. . . . ACTA has representatives at 60 military bases and airline operating centers.

► **Air France** now operates weekly DC-3 service linking Dakar, French West Africa, with Saint Louis in Senegal and with Koyes and Bamako, French Sudan.

► **Aerovias Ecuatorianas (AREA)** has acquired five new 10-passenger Avro Anson twin-engine transports built in Canada with which it will expand its routes in South America. The airline also operates four DC-3s, two Boeing S-307s and three Navions.

► **Allegheny Airlines** has purchased two more DC-3s, bringing its fleet to 14. . . . Company may use one plane for charter.

► **American Airlines** averaged more than 10 million passenger-miles per day in June, a total for the month of 320,079,000, 16% above a year ago. Load factor was 74%, compared with 80% a year ago. Fleet increase of 8 DC-6Bs explains the 6% load factor decline with a 16% gain in traffic.

► **British European Airways** reports a profit on its first 1,000 hr. operation of turboprop Vickers Viscounts. . . . Company started freight helicopter service London-Birmingham with Bristol 171s. Time is 70 min., compared with 150 min. by train.

► **California law** effective Sept. 9 authorizes cities and counties to adopt and enforce zoning restrictions for approaches to public and private airports. Law is based on recommendations of the President's Airport Commission headed last year by Gen. James Doolittle.

► **Canadian Pacific Airlines DC-4** nonstop survey flight made 2,730 mi. Mexico City-Lima, Peru, in 12 hr., 50 min.

► **Flying Tiger Line** won $2.5-million contract to overhaul 100 C-46s for USAF at Burbank, Calif.

► **Hawaiian Airlines** canceled an order for a sixth Convair-Liner because of delays in runway extension work at two airports and delivery-date slippage beyond the peak summer season. HAL has five Convairs.

► **Iberia Airlines,** state-owned Spanish line, plans to receive four Bristol 170s this year and three Super Constellations next year. Company now has four DC-4s, 15 DC-3s, one JU-52 and one Dragon.

► **Korean airlift** figures printed in AVIATION WEEK (July 13, p. 88) were not announced by Military Air Transport Service, as the story indicated. Figures were supplied by PAA with MATS approval.

PRIVATE HELIPORT

First privately owned heliport in the West to be certificated by Civil Aeronautics Administration was dedicated recently at the headquarters of Lane Publishing Co., Menlo Park, Calif. Shown landing at the new heliport is a Hiller 12-B. Lane plans to use a Hiller copter to shoot aerial photos of homes and gardens for its publication, Sunset Magazine, and will investigate transportation capabilities between Menlo Park and its offices in San Francisco, approximately 35 mi. distant.

Communist machine-gun fire dropped him in combat. But whole blood kept him alive, saw him through the hospital. He thanks you for his life.

She'd been exposed to polio. A new serum, *Gamma Globulin*, made from blood, helped ward off the dread disease. She thanks you for her life.

A tornado whipped suddenly across her home town. She was badly injured by falling debris. But a quick operation, several transfusions pulled her through. She thanks you for her life.

Three grateful people say: "we're HERE... because you were THERE!"

Each one of these people is alive today because someone gave blood.

If you've given blood before, you know how easy it is—how quick and painless. And you know what a wonderful feeling it is when you realize that what you've done may give another person his life.

Now you are asked to give blood . . . again and again. And you can do it safely every 3 months.

Because America's need for blood has increased enormously—for our armed forces, for accident and disaster victims at home, for new disease-fighting serums.

Many a life hangs in the balance! Will you help? Call your Red Cross, Armed Forces or Community Blood Donor Center today!

BUSINESS EXECUTIVES CHECK THESE QUESTIONS

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ◯ HAVE YOU GIVEN YOUR EMPLOYEES TIME OFF TO MAKE BLOOD DONATIONS?
- ◯ HAS YOUR MANAGEMENT ENDORSED THE LOCAL BLOOD DONOR PROGRAM?
- ◯ HAS YOUR COMPANY GIVEN ANY RECOGNITION TO DONORS?
- ◯ HAVE YOU INFORMED EMPLOYEES OF YOUR COMPANY'S PLAN OF CO-OPERATION?
- ◯ DO YOU HAVE A BLOOD DONOR HONOR ROLL IN YOUR COMPANY?
- ◯ WAS THIS INFORMATION GIVEN THROUGH PLANT BULLETIN OR HOUSE MAGAZINE?
- ◯ HAVE YOU ARRANGED TO HAVE A BLOODMOBILE MAKE REGULAR VISITS?
- ◯ HAVE YOU CONDUCTED A DONOR PLEDGE CAMPAIGN IN YOUR COMPANY?
- ◯ HAVE YOU SET UP A LIST OF VOLUNTEERS SO THAT EFFICIENT PLANS CAN BE MADE FOR SCHEDULING DONORS?

Remember, as long as a **single** pint of blood may mean the difference between life and death for **any** American . . the need for blood is **urgent!**

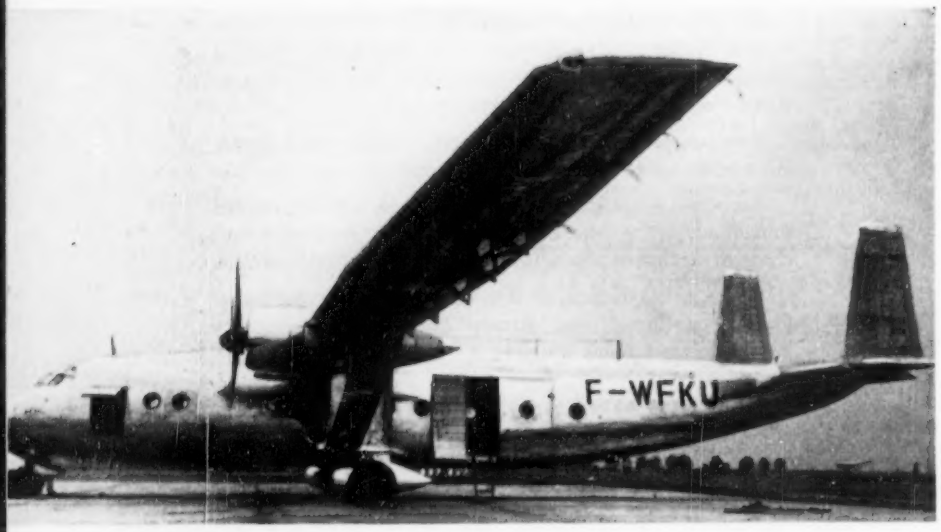
NATIONAL BLOOD PROGRAM

GIVE BLOOD

...give it again and again

New French Transports

DASSAULT M.D. 316 T—Ten-passenger light transport (above) is powered by two 800-hp. Wright Cyclones Top speed is 236 mph. The craft is fitted with three-blade props and has retractable tricycle landing gear. The large vertical tail surfaces are a noteworthy feature of the French air force prototype. This and the other transports shown on this page were on display at the recent Paris Air Show (Aviation Week July 13, p. 16).



HUREL-DUBOIS H.D. 31—Photo at left points up unusually high-aspect-ratio wing spanning 147 ft. 7 in. of the cargo transport. The wing is a 20% thick laminar-flow section of the NACA 63 series fitted with double-slotted flaps. Powered by two 800-hp. Wright Cyclones, the H.D. 31 cruises at 155 mph. Landing is fixed tricycle.

MAX HOLSTE M.H. 1521—At right, a new single-engine light freighter lands. Craft is destined for operation from unprepared fields in North Africa. Named the Broussard, the all-metal plane features a twin tail and fixed spring-steel landing gear along the lines of the type used by Cessna planes. A pre-production order for 20 Broussards is in the works. Powerplant is a P&WA R985 of 450 hp. which gives the plane a top speed of 174 mph. and a cruise speed of 146 mph. Loaded, the craft weighs 5,202 lb., empty weight is 3,196.

NORD 2501 NORATLAS—Twin-boom transport (left) bears a strong resemblance to Fairchild Packet. French air force has ordered 80 Noratlases. Plane shown made an extensive tour of South America, resulting in a reported order for 20 civilian versions by Aerovias do Brasil. Powerplants are 1,670-hp. Bristol Hercules, giving the plane a top speed of 272 mph. at 4,920 ft., a cruise speed of 210 mph. and normal range of approximately 1,500 mi. French air force will use the 2501 for carrying cargo and paratroopers.

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WEST COAST REPRESENTATIVES: Western Aircraft Supply Co., 8845 West Olympic Blvd., Beverly Hills, California

LETTERS

GCA Can Help

We do have something else! In Cockpit Viewpoint (AVIATION WEEK July 6) Capt. Robson finished his column by saying, "strict adherence to the rules of the road, maintaining adequate communications, accurate position reporting and a sharp lookout will help," and he is referring to the prevention of mid-air collision. Then he asks, "What else have we got?"

Why, we've got GCA equipment! With GCA operating in a monitoring status in good weather and as the landing aid in poor there are no extra tasks for the pilot. There is instead a relief of burden. The pilot needn't worry about blind spots. GCA has no blind spots!

While the plane is in the air and in the high-density traffic regions, its full approach is being watched by a trained crew who are doing nothing except watching that it doesn't hit anything nor is hit. They are not distracted by the multitudinous other duties of a pilot making a landing. Collision courses become apparent almost immediately and one or both parties can be warned away.

I believe there is at present a serious lack of knowledge among domestic pilots about the really tremendous potential that GCA has in preventing disaster and saving lives, dollars and time. A drive is being made by the CAA and private industry in the GCA field to acquaint domestic fliers with GCA and give them the facts regarding its outstanding work as attested by the service and international operators.

I think it is a lot "else" that we have.

STEPHEN B. RANDOLPH, Radar Sales
Bendix International Div.
Bendix Aviation Corp.
205 E. 42nd St.
New York, N. Y.

Airlines Caught Short

You are to be commended for your forthright editorial entitled, "Where Are They Coming From?" in the July 6 issue. The airlines deserve sharp criticism for their failure to anticipate potential traffic and to provide the facilities for handling this year's rush of air travelers.

This failure on the part of the airlines is costing them untold amounts of customer goodwill with plenty of dissatisfaction and cussing thrown in for good measure. I can verify this by my own very recent experiences on a New York-San Francisco round-trip involving several stop-overs.

The trip included six individual flights and three different airlines, so the criticism is not leveled at any one carrier. In no single instance did the flight even closely approach scheduled performance. From beginning to end our departures were from 1½ to 3 hours later than scheduled and, in one instance, the flight was canceled out completely.

The obvious reason for all of the delay was shortage of equipment to handle the passenger burden. The late arrivals and late departures were cumulative because in some instances turnaround schedules were involved and planes had to be serviced completely before they could take off again. At Chicago minor operating difficulties that would have been caught and corrected in a normal servicing operation caused the transfer from one DC-6 to another (which fortunately was on hand to carry out the scheduled flight).

Criticism and complaints by customers who had to spend hours waiting were frequent and bitter. Only in one instance, and this at the very beginning of the trip, was there notification of a later-than-scheduled departure. This meant long waits at the airports, and you know how uncomfortable this can be at such inadequate airports as San Francisco, Chicago and La Guardia.

My experience was not unique. Countless other passengers were subjected to the same inconveniences. On the day I left Chicago for San Francisco the UAL flight departure board showed only three on-time departures out of some 18 or 20 flights listed.

It would be interesting to have one of your editors dig up some statistics for the different airlines which would show the percentage of flights that are operating on schedule. I'll wager that there would be considerable deterioration in performance for comparative heavy traffic months during the last three or four years.

Your pertinent editorial has made it possible for one letter to do the work of three. I had intended to write to Messrs. Patterson, Damon and Carmichael direct but this letter will serve equally well.

As I stood at the gate at Chicago in the 95-deg. temperature and heard my flight postponed three different times there flashed through my mind the often advertised slogan of one of our Western railroads—"Next time try the train." And that for a 300,000-mi.-plus, 30,000-to-40,000-mi.-a-year air traveler represents heresy.

GEORGE C. TENNEY
Vice President
McGraw-Hill Publishing Co., Inc.
68 Post St.
San Francisco 4, Calif.

Reliability Experts

In your June 15 issue, page 60, you report that Northrop Aircraft has recently formed a Reliability Group, and that "Hughes Aircraft and North American Aviation reportedly have similar groups."

It may interest your readers to know that Chance Vought Aircraft has had an active group exclusively devoted to the task of measuring and improving aircraft reliability for more than two years. This group's personnel includes electrical, electronic, mechanical and industrial engineers, physicists and statisticians; the distinctions between these people merge, however, and we like to call ourselves Reliability Engineers.

The Reliability Design Group's efforts have been primarily directed towards guided missile projects, but have included both Corsair and Cutlass projects, as well as developmental aircraft. The importance of the aircraft and guided missile reliability problem has been excellently delineated in your magazine. We feel it can only be won by experts.

M. R. SELDON
Supervisor, Reliability Design Group
Chance Vought Aircraft
P. O. Box 5907
Dallas, Tex.

Crash Injury Research

Congratulations on a splendid editorial! ("Support Crash Injury Research!" June 1). We in AOPA firmly believe in the work of the Crash Injury Research project.

You failed to mention only one additional important point. Dollar for dollar, there has been so much greater benefit from the Crash Injury Research project than there has been from a number of the government "boondoggling research" projects that one wonders how such waste can be tolerated on the one hand, or such efficiency achieved on the other.

J. B. HARTRANFT, JR., President
Aircraft Owners and Pilots Assn.
P. O. Box 5960
Washington 14, D. C.

Copter Trainer

All the employes here were delighted with your June 1 article on the Piasecki trainers which were developed and constructed by us.

We are not well known in the aviation field except for our contribution in the training devices field since 1941. We have constructed some 200 special training devices for BuAer and the Air Force, but this is the first maintenance trainer we have constructed.

Your writeup was complete. We are planning a display for the September Air Show in Dayton, and we would like to know if it is possible for us to purchase 1,000 copies of your article for public distribution. If AVIATION WEEK approves of this idea, we would insert your writeup in a Burton-Rodgers folder along with other training device information. . . .

RICHARD K. FOX
Administrative Assistant
Burton-Rodgers
Blade & Helen Sts., Elmwood
Cincinnati 16, Ohio

Collins' Antenna

On page 100 of the May 25 AVIATION WEEK, in your writeup on the Douglas DC-7 you mention a "plastic ram's horn antenna for VHF." This antenna, being one of our Collins 37R VHF antennas, is made of aluminum, not plastic. Your editors, I am confident, are aware that plastic is a non-conductive substance and therefore cannot be used in antenna construction.

We are quite proud of our new 37R antenna, which has been adopted by all the leading airlines. . . .

PAUL E. CONDON
Advertising Manager
Collins Radio Co.
Cedar Rapids, Iowa

aluminum extrusions—*tough and ready*

Tough, because they're homogenized* . . . *ready,* because they're produced by Harvey.

To keep America first in the air, vital wing spars, beams, hinge sections — where pressures are greatest — must be able to take it, or else. Every single piece of aluminum leaving our plant has been pre-toughened by Harvey's own homogenizing process.

Making the most of aluminum for industry is no mere slogan at Harvey, it's a day-to-day challenge. If problems involving the application of aluminum extrusions to your supersonic and other type aircraft seem insoluble, take them to Harvey where we offer you the experienced and understanding counsel of our expert staff of metallurgists and research specialists. A Harvey Field Engineer is as near as your telephone. Call him today.

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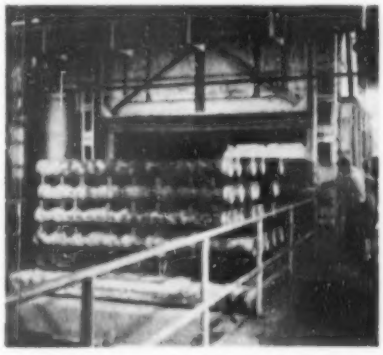
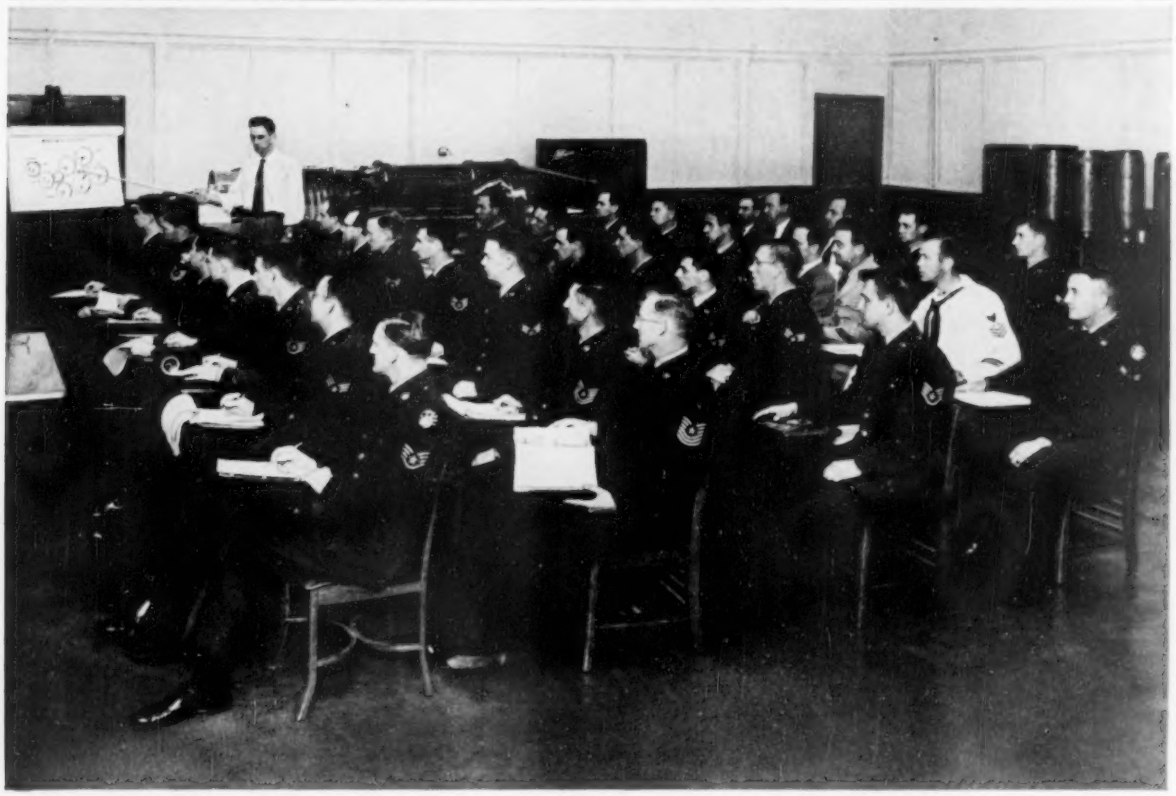


*All aluminum ingots at Harvey are homogenized, that is, strengthened by heating and slow cooling to provide uniform structure throughout.

ANOTHER REASON ALLISON LEADS IN THE AIR



An Allison Technical School instructor leading class discussion on the J35 Turbo-Jet engine.

Training the men behind the men who fly the jets

Around the world there is an ever-growing fraternity of mechanics, engineers and instructors who have earned the title, "Allison Technical School Graduate." More than 10,000 members of the Air Force, Navy and Marines have received diplomas from the Allison Technical School, in Indianapolis.

But the activities of the Allison Technical School do not stop with the classes at Indianapolis. In addition, Allison instructors from the school go out all over the world to set up classrooms at air bases and aircraft manufacturing plants to teach thousands of other technicians the proper methods of operating and maintaining Allison turbine engines. These men include pilots, flight engineers and technicians from aircraft builders and our own organization.

Students selected by the Armed Forces are usually engineering officers or enlisted personnel with long years of service. They are sent to the school for intensive 4-week courses which involve long hours in the classrooms and extra hours of homework every evening. Skilled Allison instructors with many years of varied experience make use of modern teaching aids including cutaways of J33 and J35 Turbo-Jet engines, the T38 and T40 Turbo-Prop engines.

Yes, thousands of the men behind the men who fly the jets proudly wear the badge, "Allison Technical School Graduate."

GM GENERAL MOTORS

Allison DIVISION OF GENERAL MOTORS, INDIANAPOLIS, INDIANA

World's most experienced designer and builder of aircraft turbine engines—J35 and J71 Axial, J33 Centrifugal Turbo-Jet engines, T38 and T40 Turbo-Prop engines